

*Coal for Victory*

NOVEMBER 1942

# COAL AGE

McGraw-Hill Publishing Company, Inc.

Price 35 Cents



## *In This Issue:*

PRIORITIES • SAFE MAN-TRIP CARS  
PILLARING WITH SHUTTLE CARS  
NOVEL LEVELING • FAN LOCATION  
LIGHTNING PROTECTION AT MINES

Other Features Listed on P. 6

On the Cover: New flexible man-trip cars for safety

# "Bearing Fever" Cured ... War Work Speeded

## SUN MINE LUBRICANT

Takes heat off bearings . . . puts it on production  
Cuts oil consumption by 50%



**The place** . . . a coal mine.  
**The problem** . . . hot bearings on the heart of the mine's power system — the motor generator unit. Lubricated with a competitive oil, bearings ran so hot that air had to be kept on them, constantly.

**The cure** . . . Solnus Heavy Medium, as recommended by a Sun Engineer — one of those Doctors of Industry. Bearing temperatures dropped to a safe operating point . . . no air cooling was needed . . . the loss of time due to burned-out bearings and shutdowns was

eliminated. Solnus Oils now last twice as long as the oil formerly used.

This is another typical instance in which Sun Lubricants and Sun service, working as a team, solved a troublesome lubrication problem. Whether it is a case of hot bearings, power drag or excessive wear . . . Sun's Doctors of Industry stand ready, willing and able to help you. Their services are yours to use for improving production. Write . . .

**SUN OIL COMPANY • Philadelphia**  
Sponsors of the Sunoco News Voice of the Air—Lowell Thomas

SUN WAR BONDS  
AND STAMPS



### SUN MINE LUBRICANTS

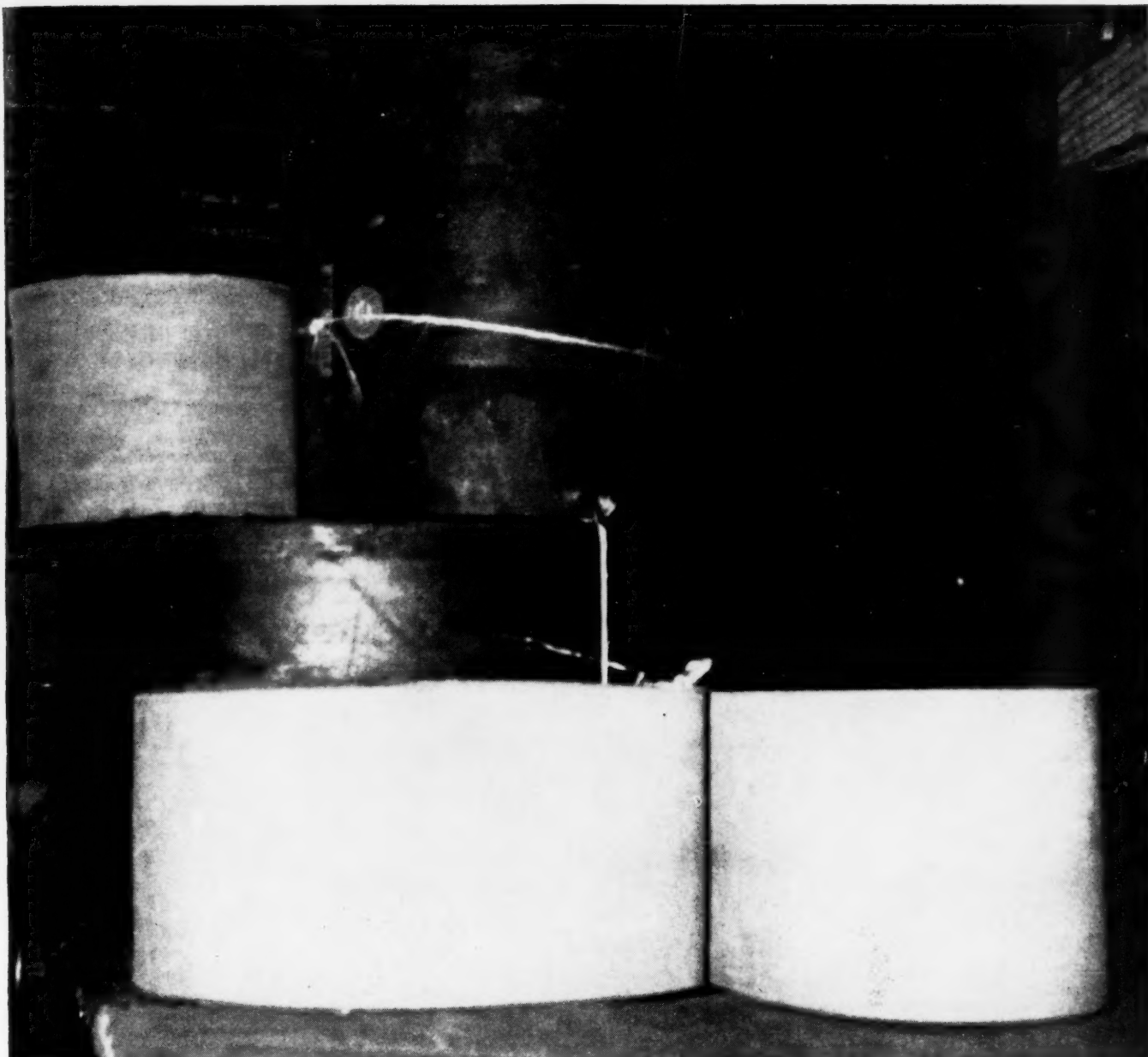
include:

SUN Pressure Grease  
SUN Compressor Oils  
SUN Journal Oils  
SUN Mine Car Lubricants  
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Bearing Greases

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## SUN PETROLEUM PRODUCTS.. HELPING INDUSTRY HELP AMERICA





## Found! Rubber in a coal mine

### *Another B. F. Goodrich suggestion to save rubber*

SAVING rubber today is just like finding it—and rubber can be saved in every plant where belts are used.

Take the case of a West Virginia coal mine. They had three old and worn belts, containing about 44 pounds of rubber, which ordinarily would have been thrown away. The B. F. Goodrich distributor suggested salvage of these belts for use on other drives—and here is what they made.

Original Belts	Made Into
2—10-in. 7 ply	1—3½-in. 5 ply—open end
1—12-in. 7 ply	1—4-in. 5 ply—open end
	1—3½-in. 5 ply—endless
	2—6-in. 5 ply—endless
	1—8-in. 5 ply—endless

Out of the original discarded belts came 6 new serviceable belts (80% or 35 pounds of the original rubber was salvaged).

*B. F. Goodrich Plylock splice may help you FIND rubber in your plant*

Converting old belts into new is a practical, easy way to salvage rubber. Frayed edges can be trimmed, worn plies stripped off, damaged spots repaired, and the patented Plylock splice can make them endless on the job. Most B. F. Goodrich distributors are equipped with portable electric vulcanizers and with their knowledge of how to make the Plylock splice, can

convert old belts and also do away with metal fasteners.

Before you discard any old belting call your nearest B. F. Goodrich distributor for his advice. (Write us if you don't know his address.) Also write us for a series of folders filled with helpful tips on how to conserve all the industrial rubber products you have. For users of conveyor belts, we will also send on request a special illustrated Belt Maintenance Manual. The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.

## **B. F. Goodrich**

**FIRST IN RUBBER**

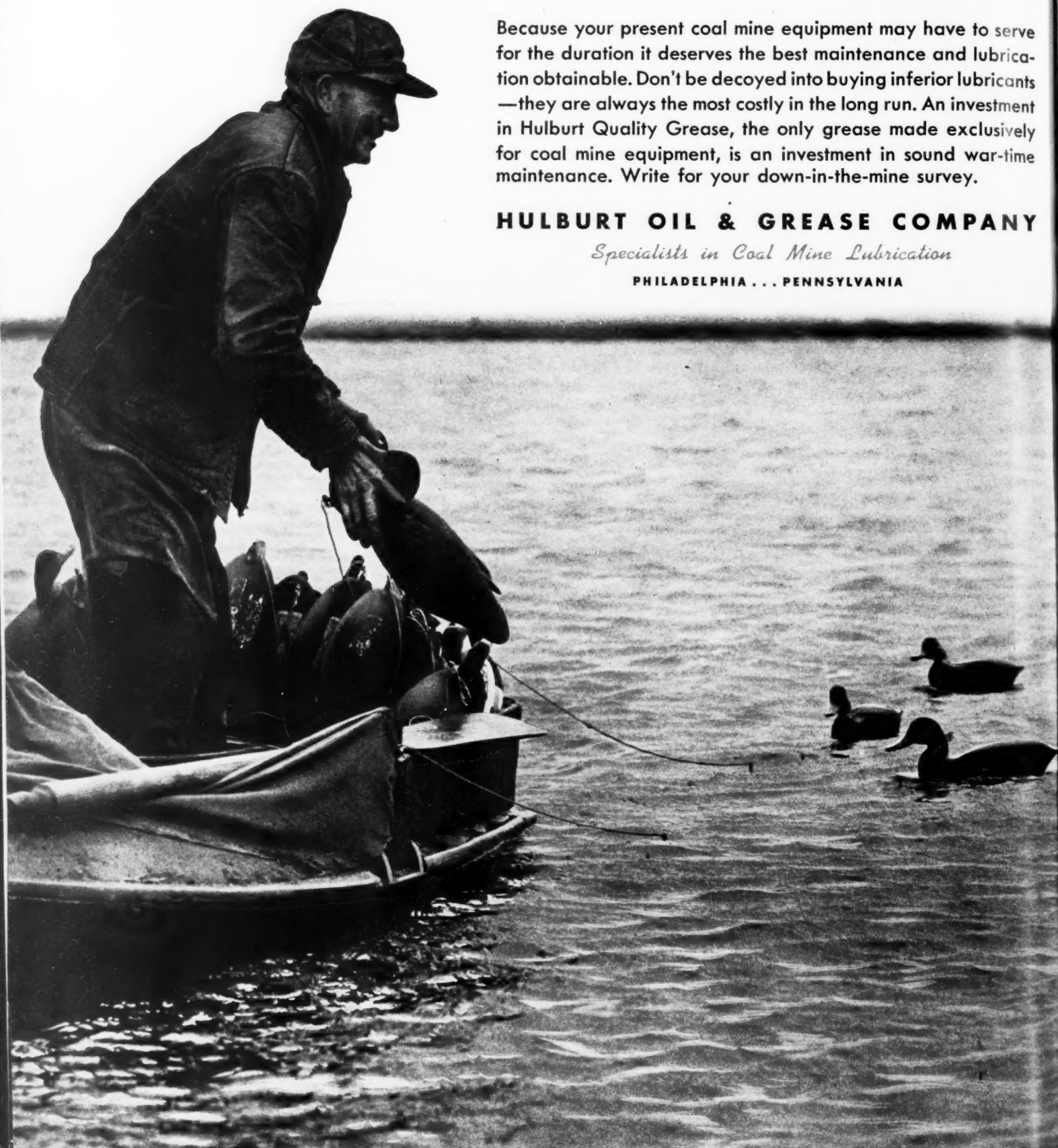
# BEWARE OF DECOYS-GE

Because your present coal mine equipment may have to serve for the duration it deserves the best maintenance and lubrication obtainable. Don't be decoyed into buying inferior lubricants—they are always the most costly in the long run. An investment in Hulburt Quality Grease, the only grease made exclusively for coal mine equipment, is an investment in sound war-time maintenance. Write for your down-in-the-mine survey.

**HULBURT OIL & GREASE COMPANY**

*Specialists in Coal Mine Lubrication*

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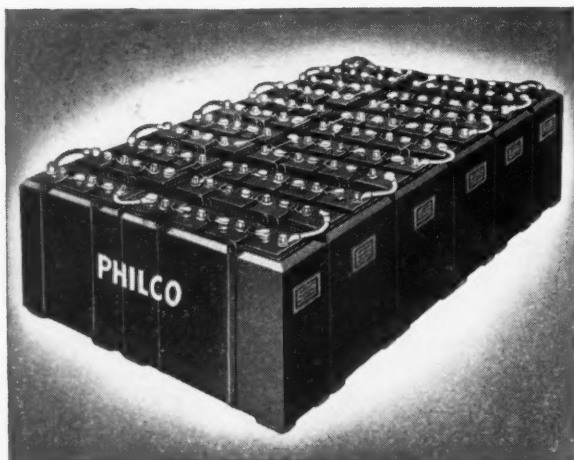
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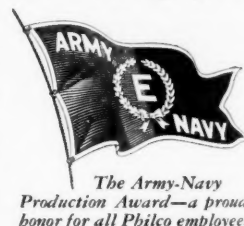
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QUALITY GREASE**

**QUALITY GREASE**

# FAST SERVICE... FAST DELIVERIES ON PHILCO STORAGE BATTERIES!



WITH Philco Storage Battery Sales Agents located in 113 U. S. industrial cities . . . with Philco production facilities *tripled* at the new Philco plant in Trenton — today you get better service and better deliveries from Philco than ever before! Write for the new Philco Battery catalogs and the name of your "local" Philco Sales Agent.



**PHILCO CORPORATION**  
**STORAGE BATTERY DIVISION**  
**TRENTON, NEW JERSEY**

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# COAL AGE

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From .....

To .....

Signed .....

### PROGRAM NOTES—COMING ATTRACTIONS

• **PRIORITIES** hold a leading place in the operation of coal mines these days, so Coal Age this month leads off with the latest thought on the subject by D. L. McElroy, head of the coal section of WPB's Mining Branch. How priorities work, what the operator should do and the future for materials and supplies are among the points discussed (p. 49).

• Operation of man-trips frequently is given scant attention around coal

mines. The cover this month shows the new man-trip cars installed at the Isabella (Pa.) mine of the Weirton Coal Co. Inside (p. 51), S. M. Cassidy, manager, tells why these cars were adopted, what things were considered in their design and what the results have been.

• Mechanical mining in recent years has been materially influenced by the advent of the shuttle car. A number of operators have found this trans-

portation unit very handy in pillar recovery as well as in other types of work. The Alpine Fuel Co., in Colorado, is one of this group, installing cars and a crawler loader to recover old, long-standing pillars. Equipment, methods and results are the subject of an article beginning on p. 53.

• Stripper fare in this issue is an article on automatic shovel leveling with the assistance of electronic units. W. E. Gildersleeve and D. Stoetzel are the authors, and their treatise includes a description of the equipment,



# WOOD

## A NAME WHICH MEANS BEST IN EVERYTHING.

One thought constantly maintained throughout our entire manufacturing process is to build shovels, spades and scoops to one unvarying and uniform level of quality. The timber for our handles, the steels for our blades, are carefully selected and thoroughly tested during each step of fabrication. All inspections made during manufacture rigidly insist on top quality. Our primary basis of factory operation is Quality Control rather than speed of production. Every shovel, spade and scoop carrying each of our brands—**MOLY . . . BIG FIST . . . WOOD . . . STUART . . . PIQUA . . . WILSON**—must be perfect from the standpoint of material, workmanship and finish.



Join the scrap drive . . . now! Do your part to provide war industries with vitally needed scrap metal.



The "Big Fist" Coal Shovel. The champion shovel of the coal mines of America.

*The* **WOOD SHOVEL** *and Tool Company*  
Piqua, Ohio

A National Organization Specializing Exclusively in Shovels • Spades • Scoops



how it operates, and how it adds to valuable digging time (p. 56).

- The right fan location can save money and help ventilation. So this month (p. 58), J. H. Dickerson continues his ventilation series with an analysis of the effect of fan location on efficiency and costs, with examples to show the savings which may be secured.

- Lightning need not leave operators powerless against its fury, as there are tried and proved methods of keeping strokes from damaging electrical machinery. These are concisely outlined by J. A. Civiletti in the article starting on p. 61. Charts and equipment tables should prove a valuable reference.

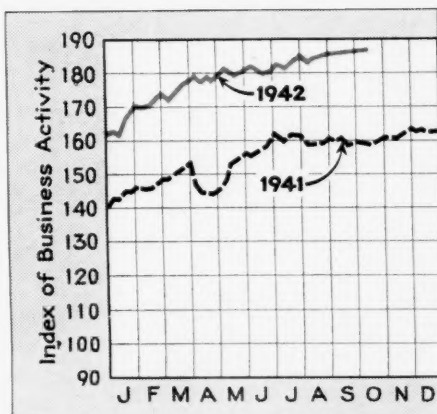
- How to boost rope life by care and inspection in lubrication (p. 64), by Frank Young, and suggestions for lessening the possibility of flood damage based on experience in the anthracite region last spring (p. 66) round out the feature section this issue. This is supplemented by the regular and timely foremen's, questions-and-answers, operating ideas and manufacturers' departments, plus the latest in news and editorials.

- Coming up in future issues, among other things, is a graphic analysis of the relation between seam thickness and mechanical-loading results in West Virginia. Based on data published by the State Department of Mines, this material provides a ready reference for any one interested in checking his results against those of a representative group of properties.

- Additional mechanical mining material includes a description of operations at the new truck mine of the Greenbrier Smokeless Coal Co., Charmco, W. Va., where one loading machine and 14 cars account for 10,000 tons per month. In the conveyor field, H. D. Sedinger offers a new plan of mining for increasing efficiency, including moving the conveyor forward in a straight line without dismantling. His suggestions are scheduled for early publication.

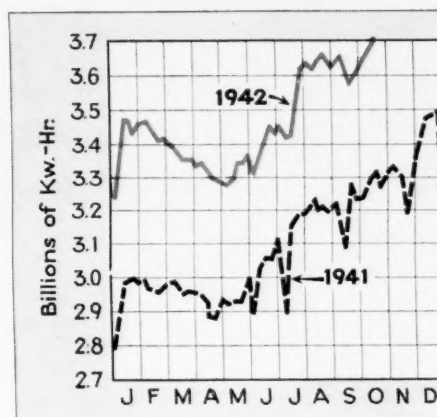
- Maintenance, ventilation, drainage and pumping and other activities involved in coal mining are among the subjects of articles on hand for early use, along with preparation and safety. On the latter score, plans call for a treatment of safety training under war-time conditions by authoritative operators in the coming December issue, along with a complete report of the proceedings of the Mining Section of the National Safety Council.

# HOW'S BUSINESS



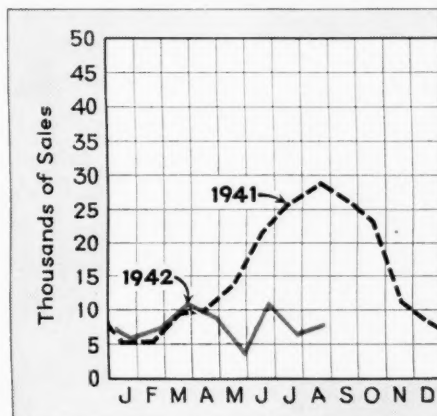
## GENERAL BUSINESS CONDITIONS

Shortages of raw materials and semi-fabricated parts for war needs are an old story, says *Business Week*, with scarcity of manufactured goods for civilian use soon to become increasingly apparent, and a shortage of dairy and other food products not impossible. Steel production has been at 101 percent of capacity for two successive weeks. All in all, the rationing principle bids fair to dominate American economy before long. The *Business Week* Index touched 188 for the week ending Oct. 18, compared with 187.4 a month earlier and 160.8 a year previous.



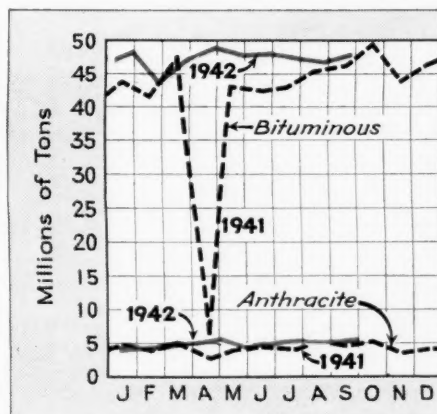
## ELECTRIC POWER OUTPUT

Production of electric energy by the electric light and power industry showed during the week ending Oct. 17 a continuation of the upward trend reestablished during the preceding week with a fractional gain, according to figures by the Edison Electric Institute. The latest week showed a 12.2 percent gain over the corresponding week last year as against 10.3 percent gain in the preceding week. Figures of output for recent weeks are: Sept. 19, 3,757,000,000 kw.-hr.; Sept. 26, 3,720,000,000; Oct. 3, 3,683,000,000; Oct. 10, 3,702,299,000; Oct. 17, 3,717,360,000 kw. hr.



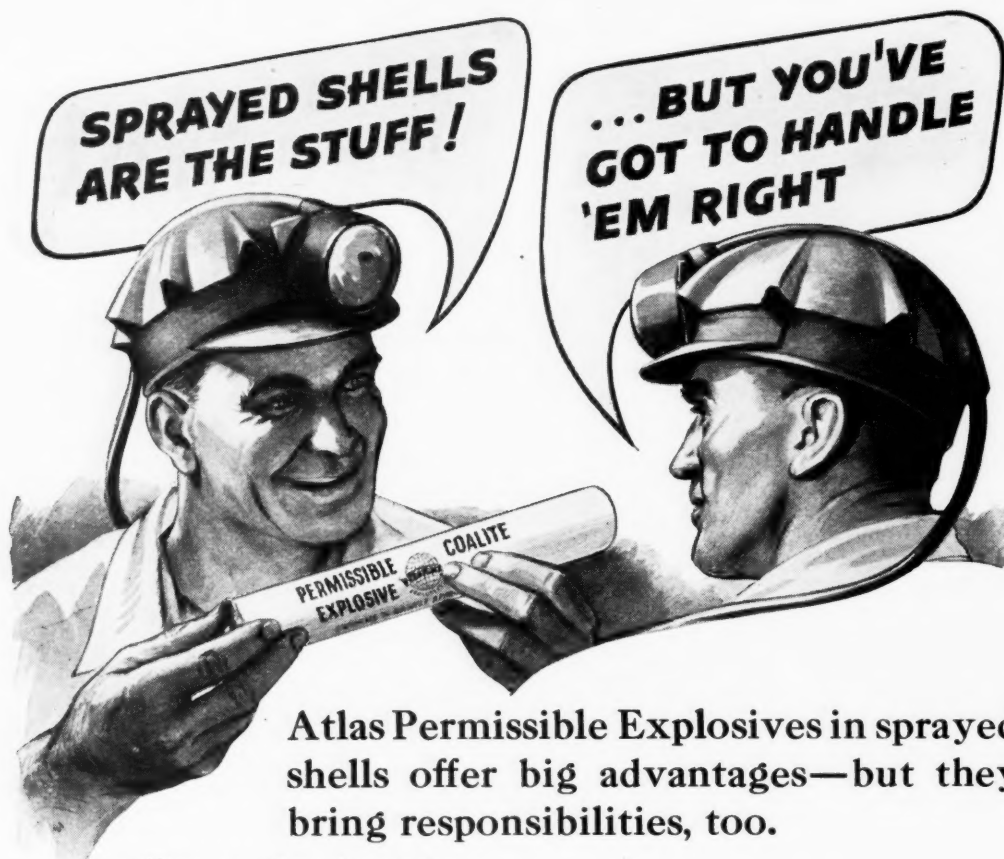
## COAL STOKER SALES

Sales of mechanical coal stokers in the United States in August last totaled 8,350 units (U. S. Bureau of the Census from 67 manufacturers; 8 have discontinued the manufacture of stokers for the duration of the war and 26 did not report any sales), compared with 7,468 (revised) in the preceding month and 28,731 in August, 1941. Sales of small units in August last were: Class 1 (under 61 lb. of coal per hour), 6,965 (bituminous, 5,211; anthracite, 1,754); Class 2 (61-100 lb. per hour), 621 (bituminous, 602; anthracite, 19); Class 3 (101-300 lb. per hour), 375.



## COAL PRODUCTION

Bituminous coal produced by United States mines in September last (preliminary) totaled 48,760,000 net tons, according to the Bituminous Coal Division, U. S. Department of the Interior. This compared with output of 47,160,000 tons in the preceding month and 47,505,000 tons in September, 1941. Anthracite tonnage in September last, according to the U. S. Bureau of Mines (preliminary), was 5,418,000, as against 5,180,000 (revised) in the preceding month and 5,334,000 tons in September, 1941.



**Atlas Permissible Explosives in sprayed shells offer big advantages—but they bring responsibilities, too.**

**Here are the advantages—**

1. Reduction in smoke.
2. Reduction in "powder odor."
3. Easier handling of the cartridges.
4. Faster return to the face.
5. Greater output.

But for satisfactory and safe results, the operator must keep close supervision over the storage of his sprayed shell permissibles. He must—

1. Have a dry, well-ventilated outside magazine.
2. Take only one day's supply of explosives into the mine.

Since the cartridges of sprayed shell permissibles are not redipped in paraffin, they have less protective coating. They keep smoke and fumes at a minimum, but need good storage because of their reduced resistance to moisture.

Sprayed shells are another example of the type of cooperation going on between manufacturers and consumers to increase production. The assumption of responsibility by each will result in more and better coal.

Write for your copy of the booklet, "9 Ways to Get the Most from Your Explosives."



**ATLAS POWDER COMPANY** **WILMINGTON, DELAWARE**

# ATLAS

## EXPLOSIVES

Offices in  
Principal Cities

*"Everything  
for Blasting"*



# STOP WORRYING ABOUT

## GRADES



## WET PLACES



## LOW VOLTAGE



## USE

*Jeffrey*

## UNDERGROUND CONVEYORS

Jeffrey  
chain  
made



22-41



Jeffrey positive-motion conveyors . . . 17 standard units, chain or belt types, from which 54 combinations can be made . . . to meet all coal mining conditions.









# **JEFFREY**

## **EQUIPMENT for MECHANIZED MINING**

**CUTTERS**

**DRILLS**

**LOADERS**

**LOCOMOTIVES**

**FANS**

 **CONVEYORS**

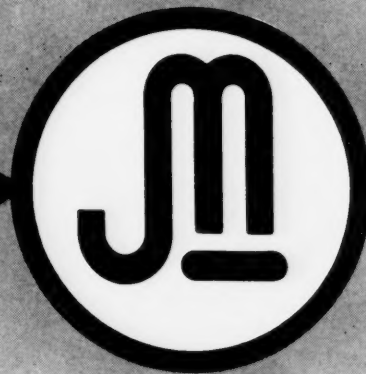
**BLOWERS**

**JIGS**

**CRUSHERS**

**SCREENS**

**RENEWAL PARTS**



**BELOW AND ABOVE GROUND  
FROM FACE TO RAILROAD CAR**

**Y**  
**ING**

## UNDERGROUND CONVEYOR MAINTENANCE HINTS . . .

To get continuity of service and maximum production from your mine conveyors, with the least time out for repairs.

### 1. KEEP THE CONVEYOR CLEAN

At least once a shift, remove coal from under discharge ends and around power units. This allows for ventilation of both motor and speed reducer. Clean thoroughly around flexible couplings—remove all guards at least once in eight shifts. Remove excess coal to prevent building up and coming in contact with coupling. This saves leathers in case of belt conveyors—discs in case of chain conveyors.

Remove covers on motors at regular intervals and clean out any accumulation of dust or coal from inside of motor case. Make careful inspection of brushes and brush holders.

### 2. MAKE SCHEDULED INSPECTIONS

Check oil level in speed reducers, condition of control cables, and working parts of controls. Inspect all electrical connections.

Check coal conveying chain. See that all cotter pins are in place—all badly bent flights replaced. Check condition of roller drive chain. See that proper shear pins are used in shearing hubs. Check condition of both head and tail end bearings at regular intervals.

Check motor bearings—make sure they are not getting an excessive amount of grease that might go on into working parts of motor.

If belt conveyors—inspect condition of belt and all idlers. Repair minor injuries to belt—grease all idlers. Watch the return idlers—remove all fines to keep them revolving.

### 3. LUBRICATE AT REGULAR INTERVALS

Use proper kind and proper amount of lubricant as required on all bearings. Lubricants and lubricating devices should be handled so they do not become contaminated with foreign matter. Pay particular attention to oil level in speed reducers—USE PROPER LUBRICANT BY ALL MEANS.

### 4. DO NOT OVERLOAD CONVEYORS

Conveyors are built for certain recommended lengths and capacities—do not exceed this as it will result in high maintenance and shorter life for the units. Do not operate conveyor chain at greater speed than is required for the average output.

Take periodic electrical readings at point of operation. Overloading will cause burnt-up motor, requiring critical material to repair.

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**UND**  
**CAR**

## Let's KEEP Our War Mines "Converted" for War    ★    ★

**F**ROM mine operators and their suppliers, large and small, far and near, we learn that WPB'S fourth quarter allotments of critical materials, also the A-A-2-X priority recently granted essential mines, are inadequate for maintaining required production and safe inventories.

So inadequate that unless inequalities are challenged promptly, and adjusted by WPB directives as soon as the merits of the case are proved, even *big* mines must halt or slow down production shortly—literally for want of items as small yet vital as a *drill bit*!

Modern mining on the scale now so *primary* to our whole war program is a highly *mechanized* coordination of men, machines and power. With our mine labor shortage still acute a *maximum* output from existing labor can continue only if WPB sees to it that the flow of necessary machinery and supplies is maintained by the *top priorities* set up for essential mines last Spring.

Our mines producing vital coals, metals and non-metallics have been asked to produce

now as never before—The Chief Executive, the Army, Navy, WPB and WMC have all declared that our Victory War Machine *Starts* at the mines—that mining men are literally America's *first* Soldiers on the Home Front.

We agree. But mining men can't man these "guns" without continued adequate tools of production kept flowing on time. And if the makers of these "guns" are forced by lack of materials to convert to direct war goods just how will we overcome existing shortages of the very critical materials which *start* at the mines?

Does any other war problem at home deserve more consistent and all-out support from every arm of government—and from every war industry dependent on adequate mine production?

Washington papers please copy!



PUBLISHER

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# PROTECT the Employee and SPEED Production—

**F**or 27 years Bethlehem has been waging war on the most dangerous saboteur of industrial production—accidents. Today, with the future of the nation so dependent upon top-speed production of war steel, we are stepping up the safety and

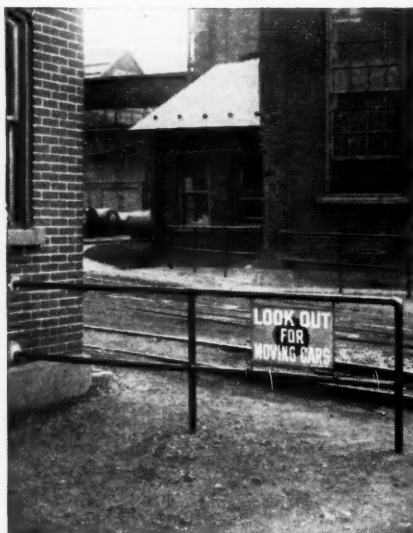
first-aid effort on a widening scale.

First-aid instruction is being given to thousands of employees. Established safety practices are daily being intensified. More safety shoes, goggles, helmets, respirators and fire-proof clothing. More warn-

ing signs and flags to mark danger spots. More safety posters to keep workers safety-conscious. . . . No detail is overlooked which can possibly contribute to the fast, efficient, safe production of steel for America's ever-growing war needs.



**TOE-SAVING SHOES**—Each of these five steel-reinforced safety shoes saved a foot from painful injury and kept one more worker on the job, fit, and able to continue doing his share to keep up the flow of Bethlehem's war production.



**DANGER SPOT**—But it's been rendered harmless by a short railing and a sign. Instead of stepping out blindly from the corner of the building, workers must cross the track at a point where they can hardly fail to notice an approaching train.



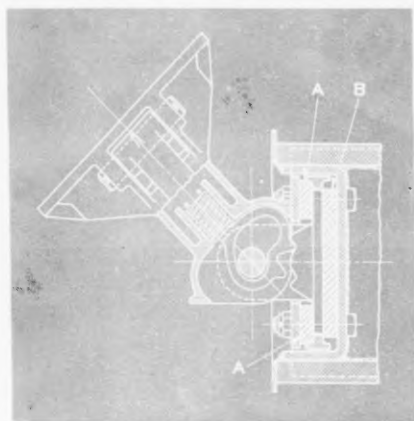
**REHEARSAL**—This team of first-aid men is giving treatment to an accident "victim" at one of Bethlehem's first-aid contests, held annually for many years. Thanks to this training, thousands of Bethlehem-trained first-aiders are constantly on the alert in steel plants and mines to prevent or treat industrial accidents.



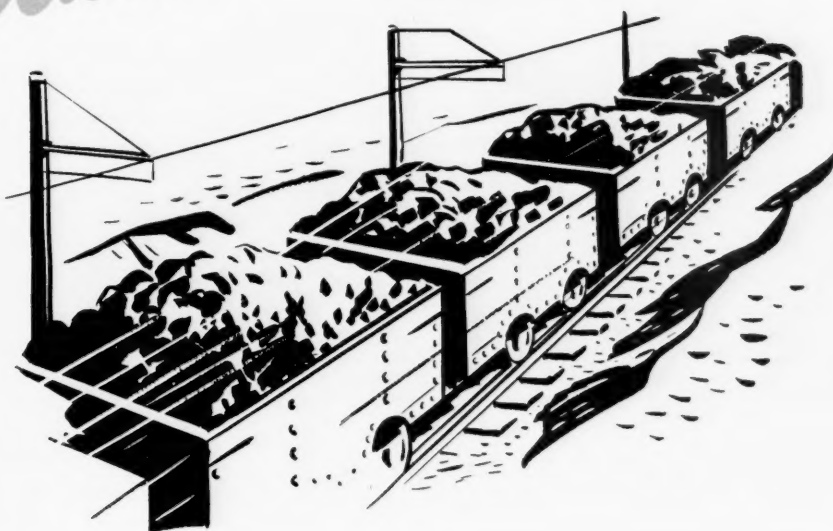
**SAFETY SCHOOL**—By movies and lectures, Bethlehem employees are continuously being trained in the safest, most efficient methods of handling their jobs. Year after year, this education in the safe way to do every job goes steadily forward.



# KEEP YOUR MINE CARS ON THE JOB WITH O-B Automatic Couplers



Female coupler unit. Rubber buffing pads, A and B, absorb up to 50,000 lbs. impact, prevent damaging jolts and strains.



Replacing antiquated link and pin fastenings, O-B Automatic Coupling will remove 15 to 20 feet of dead slack from a trip of mine cars; eliminate damaging impacts, distorting side-strains and frequent derailments which conspire to keep those mine cars in the repair shop. And every hour your cars remain on the job means extra tonnage for the war effort.

Cushioned from damaging jolts and impacts by its rubber draft gear, the O-B Coupler-equipped car stays on the job, hauling coal for you. Impact blows up to 50,000 lbs. are easily absorbed. In addition, rigid steel-beam connections keep the cars in line, cut down derailments.

If you are planning the purchase of new mine

cars and want to keep those cars on the job, day-in and day-out, investigate the O-B Automatic Coupler—the only truly automatic coupler that gives you positive interlock, automatic self-centering, and an unbreakable rubber draft gear. Write today or see your O-B Representative for more complete information.

2303 AM



## Ohio Brass

MANSFIELD, OHIO  
CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

# DOUBLE *MACHINERY* *LIFE..*



## .. BY KEEPING IT PROPERLY SERVICED !

From a business standpoint . . . keeping your machinery properly serviced makes it last about twice as long . . . doubles its output before replacement — lowers investment, depreciation, operating cost, increases your profits.

From a patriotic standpoint . . . it releases twice as many machines for our fighting forces . . . sorely needed machines!

It's easy to keep 'em repaired, too! You simply reach for your 'phone, call your dealer and in a short time he'll have your outfit fixed and back to work! In every territory, throughout the continent, there is an Allis-Chalmers dealer ready to give you quick, expert service and advice. When you have a problem, his knowledge and experience plus yours will quickly solve it. When you have a repair or rebuild job he'll furnish you the highest type mechanical skill, using genuine parts replacements. Dealer service is mighty valuable — use it to your fullest extent. Keep in close touch with your Allis-Chalmers dealer at all times. Let him help you keep 'em going!



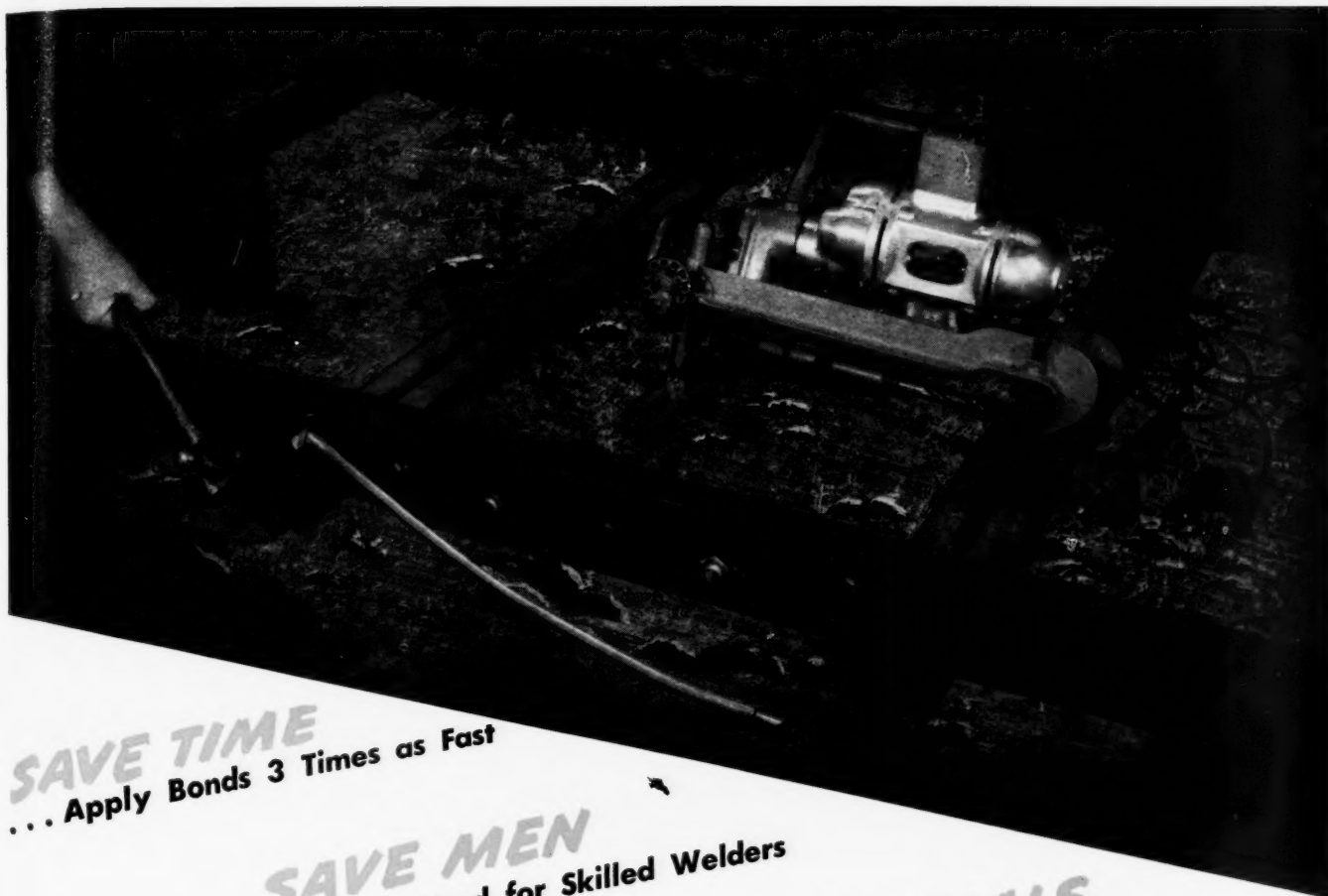
*Running a machine in need of repairs one day longer than you should may require 10 times as much critical material when you finally have it fixed—be many times as expensive. Protect your own interest . . . help the war effort — have your Allis-Chalmers dealer repair, replace, rebuild your outfits now.*

# ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE • U. S. A.

***THROW YOUR SCRAP  
INTO THE FIGHT!***





**SAVE TIME**  
... Apply Bonds 3 Times as Fast

**SAVE MEN**  
... No Need for Skilled Welders

**SAVE MATERIALS**  
... No Welding Rod Required

*-with the O-B Wedge Bonding System*



**TIME**—Speeding up rail-laying time from minutes to seconds, the O-B Wedge Bonding System is keyed to the requirements of modern mechanized mining. O-B Electric Mobildrill will bore a hole through a 40-lb. rail in less than 40 seconds. Wedge Bond may be installed with a few hammer taps, 20,000 lbs. of expansion pressure cold-welding the terminal to the rail. Some properties find Wedge Bonds may be installed three times as fast as welded bonds.



**MEN**—With good welders at a premium under present conditions, why not turn your bonding job over to your track-laying crew? Equipped with the O-B Wedge Bonding System, this crew can apply bonds as fast as new track is laid—insure all coal taken from a new section will be mined under good electrical conditions.

**MATERIALS**—Absolute reclaimability means you can use the Wedge Bond over and over again—save vital copper for the war effort. In addition, the bonding process becomes merely a matter of a few hammer taps, sparing valuable welding rod for tanks, guns and planes. And don't forget,  $2/0$  bonds offer additional savings as they use but  $3/5$  as much copper as  $4/0$  bonds.



2304-M



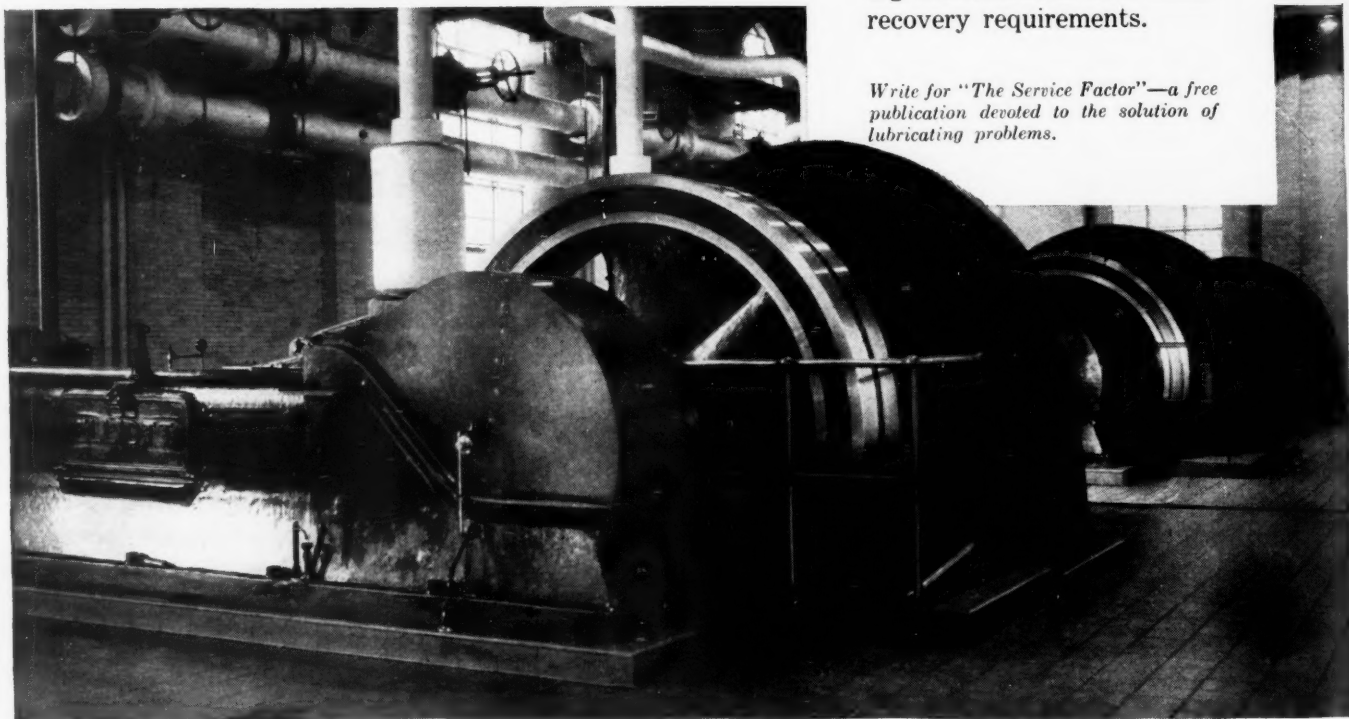
**Ohio Brass**  
MANSFIELD, OHIO  
CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT



**SECOND FRONT STRATEGY** needs home front strength. For maintenance of peak operating efficiency and necessary conservation of equipment in STEAM POWER plants use

**...SINCLAIR STEAM CYLINDER and VALVE OILS.** These oils are designed for *correct* power house lubrication under all operating combinations and steam recovery requirements.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.



# SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE NEAREST SINCLAIR OFFICE  
SINCLAIR REFINING COMPANY (Inc.)

2540 WEST CERMAK ROAD  
CHICAGO

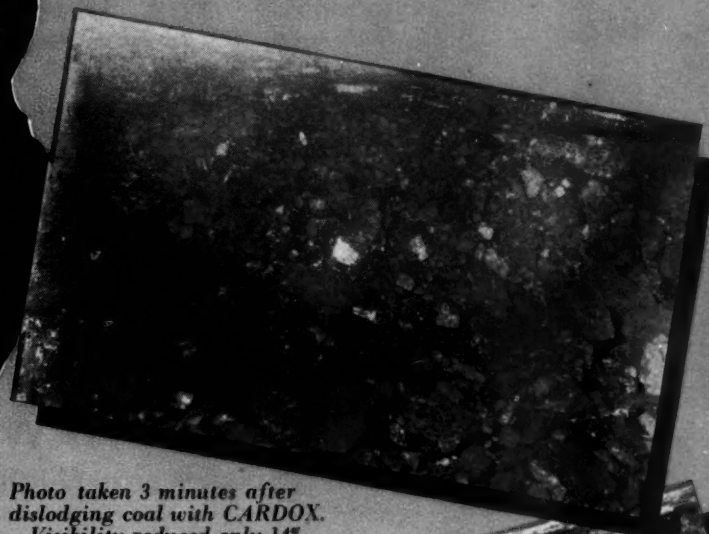
10 WEST 51ST STREET  
NEW YORK CITY

RIALTO BLDG.  
KANSAS CITY

573 WEST PEACHTREE STREET  
ATLANTA

FAIR BUILDING  
FT. WORTH

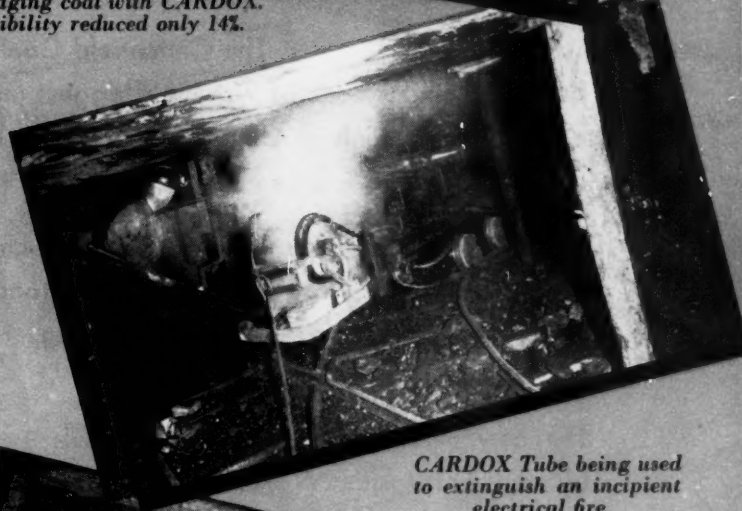
# for SAFETY'S SAKE.... break down your coal with **CARDOX**



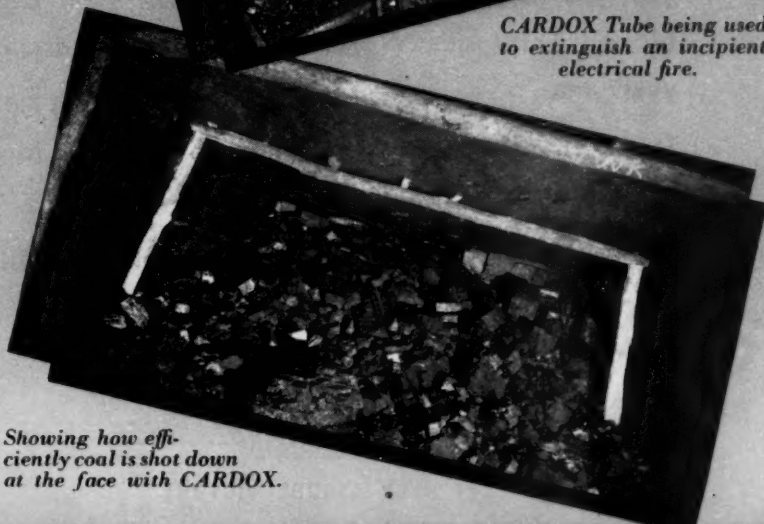
*Photo taken 3 minutes after  
dislodging coal with CARDOX.  
Visibility reduced only 14%.*

War production requirements and war-time labor problems put new emphasis on the value of CARDOX in reducing fire and accident hazards. CARDOX removes the hazards of storing and handling explosives. It is less likely to cause roof failures. It squares up both face and rib so that the dangers resulting from overhanging brows in high seams are greatly reduced. It eliminates the possibilities of dust and gas explosions by blown out shots. Impacts, friction, sparks or even flames have no effect upon CARDOX. Its disruptive action is produced by carbon dioxide, which is smokeless, odorless and non-poisonous. Cardox-equipped mines commonly use CARDOX Tubes as emergency fire extinguishers.

Let us demonstrate by a test in your own mine, how CARDOX can help increase production while reducing fire and accident hazards.



*CARDOX Tube being used  
to extinguish an incipient  
electrical fire.*



*Showing how effi-  
ciently coal is shot down  
at the face with CARDOX.*

## **CARDOX CORPORATION**

BELL BUILDING • CHICAGO, ILL.





Enterprise mine cars equipped with Timken Bearings at the No. 9 mine of the Clinchfield Coal Corporation.

The Clinchfield Coal Corporation, Dante, Virginia, is one of Virginia's biggest mine operators, and its No. 9 mine at Clinchco also is one of the largest single mines in Virginia, producing 4,000 tons per day.

All of this coal is hauled out in 350 new Enterprise mine cars having an average capacity of 4 tons each. These cars were placed in service last spring, replacing 520 old type cars.

The new cars are of the stub or 4-axle type pioneered by the Enterprise Wheel and Car Corporation many years ago.

Thus, another outstanding coal operator swings to Timken Bearing Equipped mine cars—and finds it *pays*.

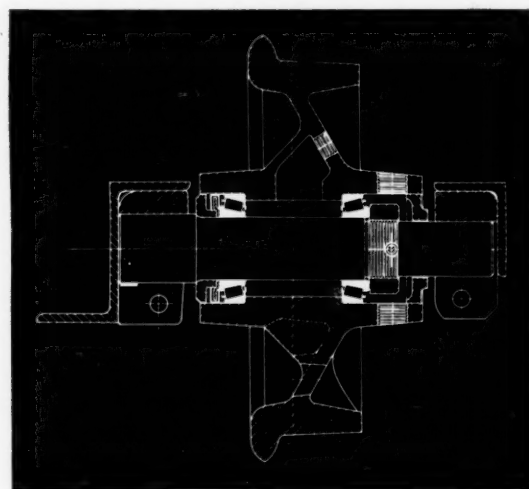
THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

**TIMKEN**  
TRADE-MARK REG. U. S. PAT. OFF.  
**TAPERED ROLLER BEARINGS**

**HELP ASSURE VICTORY**

Buy War Bonds. Conserve Rubber. Eliminate Unnecessary Travel. Use the Telephone Only When Important. Salvage All Scrap and Waste Material.

Section through wheel of Enterprise mine car showing application of Timken Bearings.



To assure  
an early Victory and  
a prosperous peace, put  
more Timken Bearings in  
your mining equipment.  
**Redesign now.**

# WALTER TRACTOR TRUCKS

*are designed . . .  
powered . . . built  
to meet  
emergency conditions!*

THE extra power, traction and stamina of Walter Tractor Trucks are proving their value in meeting emergency war demands. Except for time-out for normal servicing, these rugged hauling units keep going day and night under maximum loading and running — regardless of severest surface or weather conditions and steepest grades. Fast hauls of 25 to 40 tons in single trailers—up to 50 tons in double trailers, are standard practice.

The outstanding performance of Walter Tractor Trucks in coal stripping, is due to the exclusive Walter 4-Point Positive Drive. This advanced four-wheel drive system utilizes patented automatic locking differentials — suspended double reduction drive — tractor type transmission and other engineering features, to provide enormous power and positive traction in each wheel, according to its needs at any instant. Short wheel base and correct weight distribution provide easy handling and turning in a short radius. Write for detailed literature.

## WALTER MOTOR TRUCK CO.

1001-19 Irving Avenue, Ridgewood, Queens, L. I., N. Y.

### PARTS AND SERVICE FOR WALTER TRUCKS

Consult your local  
Walter distributor for  
expert repair service  
and genuine parts to  
keep your Walter  
Trucks in top running  
condition.



# *RECONDITION* your old car to





# to haul more, ***FASTER*** ..

With increasing coal production and higher mine car speeds, mine cars are now under heavier burdens than ever before.

This is a good time to check up carefully on your mine car equipment. You may find some old cars that seem headed for trouble — but new trucks with modern heavy-duty automotive type bearings will very likely make those old timers operate even better than when they were new.

We can supply wheels, complete trucks, axles, bumpers, and electrically welded end sill construction with spring bumpers, quite promptly. Delivery of complete cars depends upon receipt of materials.

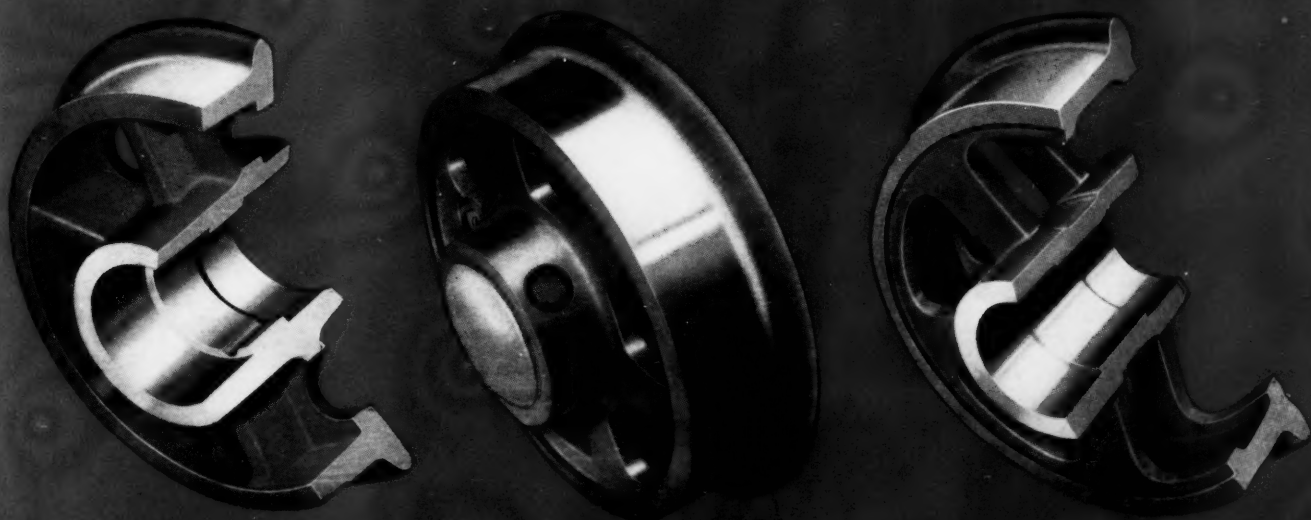
If you do not wish to get new mine cars now, renew the old ones with A.C.F. modern trucks. Every part of A.C.F. mine car equipment receives most careful consideration — for whatever A.C.F. builds, it is known to build well!

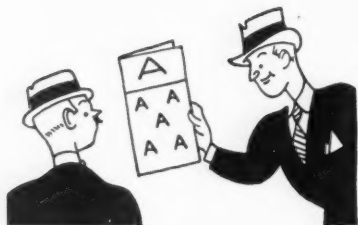


# A.C.F.

## AMERICAN CAR AND FOUNDRY COMPANY

NEW YORK • ST. LOUIS • CHICAGO • PHILADELPHIA • BERWICK, PA.  
PITTSBURGH • CLEVELAND • HUNTINGTON, W. VA.

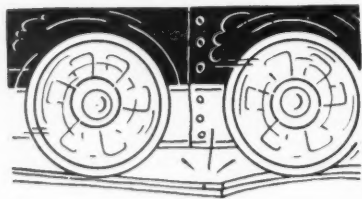




### Better than a Priority!

With copper supplies so critical, it's no surprise that motor generators are hard to get. But Edison Batteries can be charged directly from the d-c power line . . . they take their charge just as your mine is best equipped to supply it. Normal fluctuations in voltage present no problem to alkaline batteries, which do not require even a tapered finishing rate.

**E**asy Maintenance! Maintenance alone produces no coal or ore. When Thomas A. Edison invented the alkaline battery he not only created a power reservoir which does its job better—he created one that requires much less maintenance than any other. One time, maintenance was simply a matter of cost—today it is a vital matter of production, too. Taking care of Edison Alkaline Batteries is not a chore—it is simply a matter of following very easy rules.



**O**ver the Bumps! With everybody from Washington down crying for more production, practical men are pointing out how often haste makes waste. Equipment never took the abuse it is taking today—which is all right if it doesn't hold up the output. Alkaline batteries can take more hard bumps than any other battery ever made. Their construction is proving that when you want strength you want steel.

**Cap Lamps!** More than 90% of all the electric cap lamps used in mines depend upon alkaline batteries for current.

**Edison Storage Battery Division**  
**Thomas A. Edison, Inc.**  
 WEST ORANGE, N. J.

# POWER

## delivered as ordered



You dig it . . . railroads haul it . . . America needs it! That's the story of today's vital materials. And in mines where Edison Alkaline Batteries power the hauling equipment, foresight is having its reward. Alkaline batteries are standing up under today's gaff. Just as the railroads are finding them so thoroughly dependable in crucial signal work and as auxiliary power equip-

ment on passenger cars, so mining men know today more than ever that the characteristics of the Edison are those best suited to this heavy-duty service. Alkaline batteries get the work out . . . with the least trouble, the least maintenance and the least failure on the job. Where records have been kept this has always been proved.

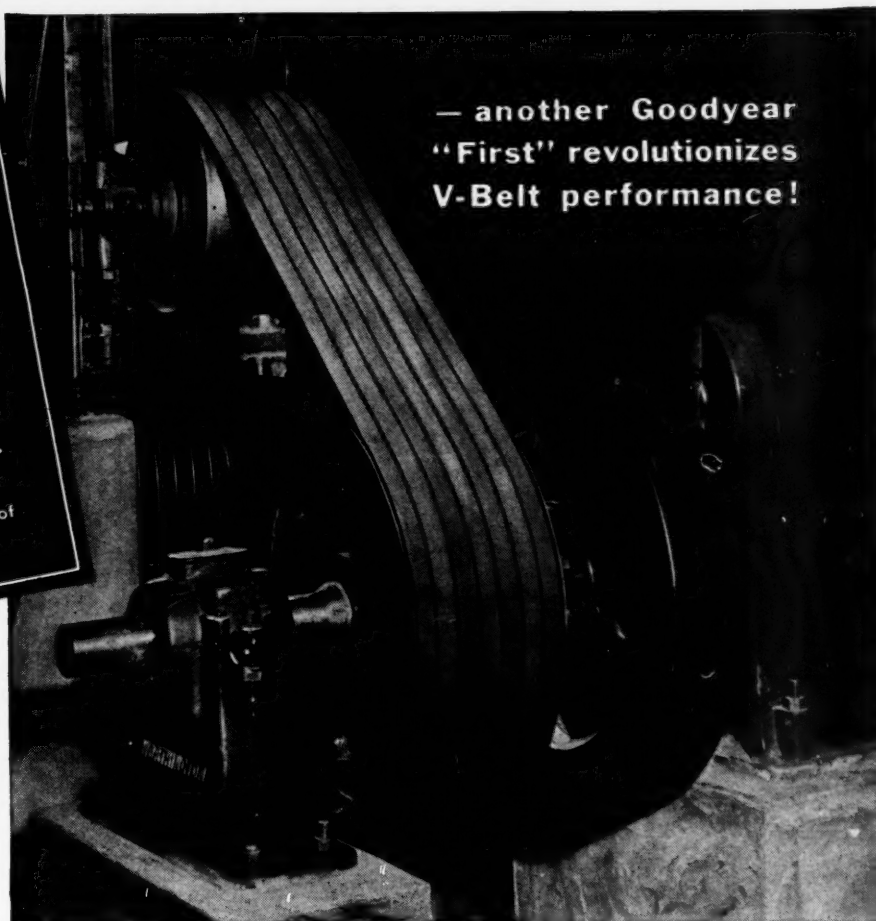
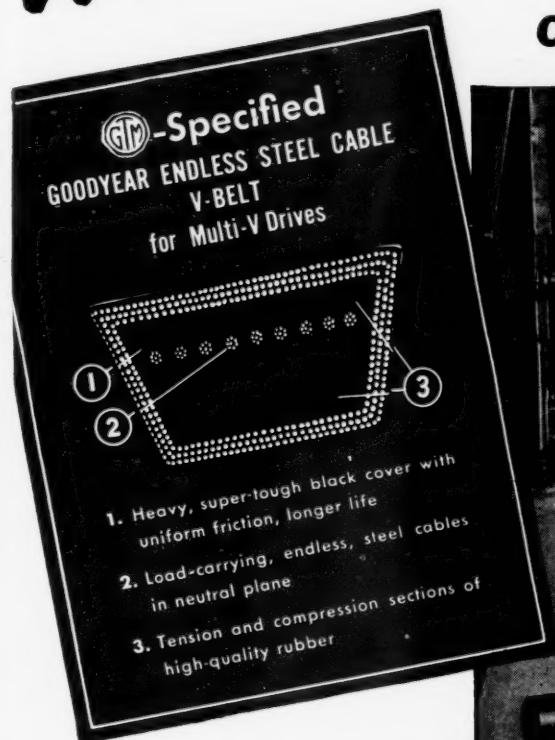
**MINING NEEDS THE DEPENDABILITY OF**

# Edison

## Alkaline BATTERIES

# Here's THE ULTIMATE V-BELT

Constructed with endless steel cables



**A**FTER many months of research, development and field operation on the hardest drives, work has just been completed on another Goodyear "First"—the V-belt of the future, built with endless steel cables in place of conventional cotton cord construction.

In exhaustive tests this new Goodyear Endless Steel Cable V-Belt has averaged more than SEVEN times longer service-life than the best cotton cord belts — with less than  $\frac{1}{2}$  of 1% stretch.

The outstanding advantages of the Goodyear Steel Cable V-Belt, the latest addition to the outstanding line of Black E-C Cord Multiple V-Belts, make it possible to engineer Multi-V drives where space limitations and other engineering factors formerly denied their usage.

**Greater Strength Factor:** far heavier drives can now be changed over to economical Multi-V operation.

**Highest Heat Resistance:** proved on U. S. Tanks.

**Minimum Stretch:** practically zero stretch with fewer adjustments.

**Uniform Stretch:** every belt takes its proportional share of the load, giving smoother operation.

**Far Longer Life:** lowest over-all cost for heaviest drives.

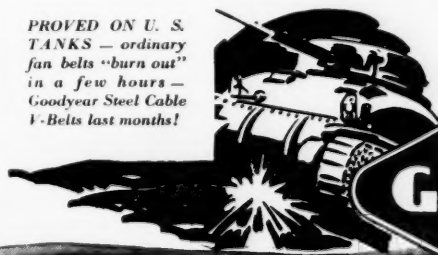
So successful is this construction proving, that new high standards are set in all phases of Multi-V drive performance and wartime production is speeded up. Its many advantages and economies are

another Goodyear "First"—a triumph of G. T. M. rubber engineering — at present only available for special war jobs and critical drives for war work operation.

For complete information, consult the G. T. M. — Goodyear Technical Man — or write Goodyear, Akron, Ohio, or contact the nearest Goodyear mechanical goods distributor.

E-C Cord—T.M., The Goodyear Tire & Rubber Company

**PROVED ON U. S. TANKS** — ordinary fan belts "burn out" in a few hours — Goodyear Steel Cable V-Belts last months!



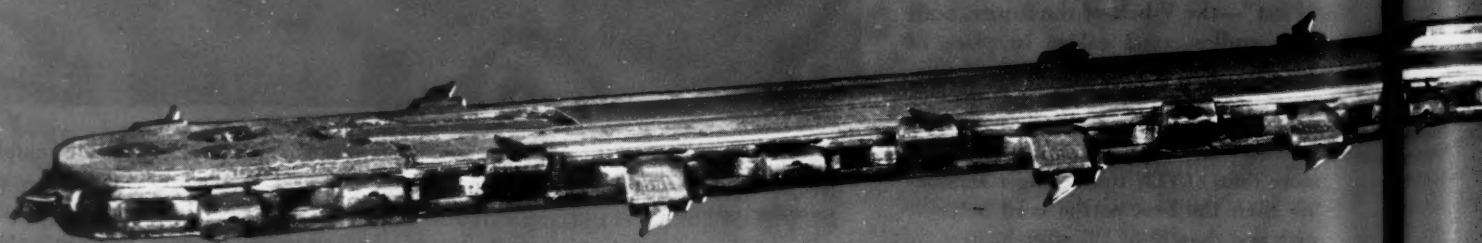
**THE GREATEST NAME IN RUBBER**



# *For Heavy Work . . . . .*

## **THE GOODMAN 512 SHORTWALL**

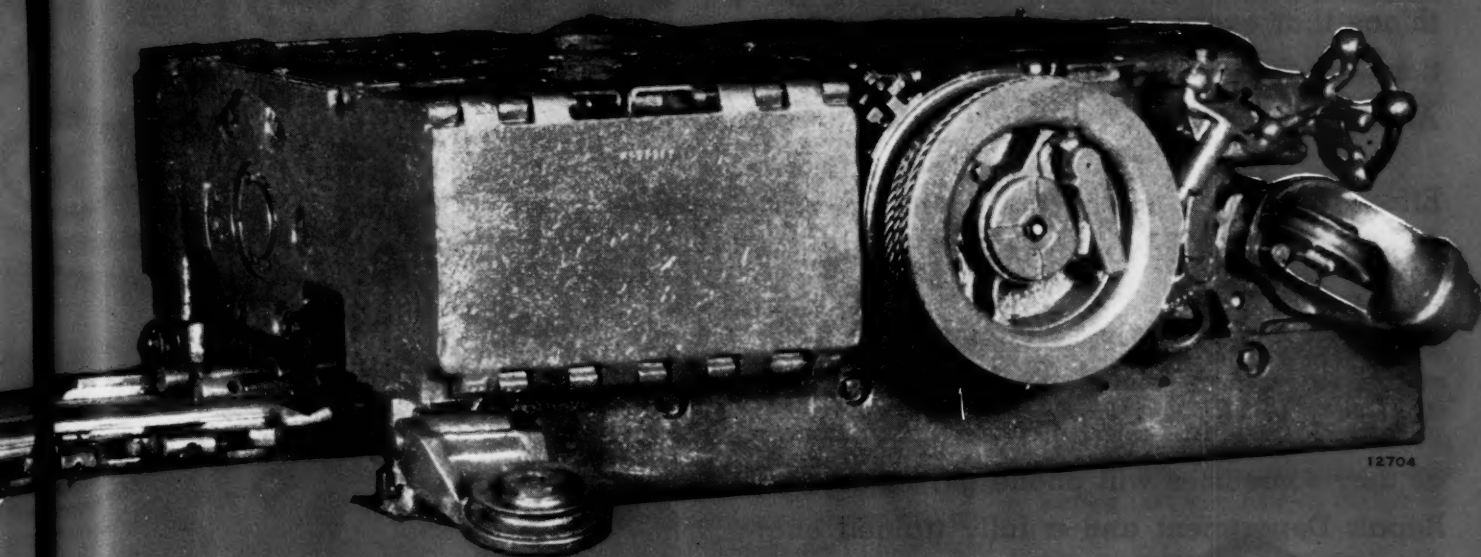
64 inches long, 23½ inches high, 51 inches wide  
... a compact machine low enough to operate  
effectively in most seams, short enough to operate  
effectively in close posting. Its capacity for con-  
tinuous work and its economy of operation rank  
it as a distinctive machine of a distinctive line.



Industry and trans-  
port, vital factors  
in National Defense,  
demand COAL and  
METALS. Thousands  
of tons are pro-  
duced daily with  
Goodman mining  
machinery.

**GOODMAN MANUFACTURING COMPANY**

... *For Long Life*



Consult a Goodman  
engineer for  
complete details.

HALSTED STREET AT 48TH • CHICAGO, ILLINOIS



# Looking Ahead!

The home you're going to own some day; the security that your family is going to enjoy. The education you intend to give your children, the advantages you want them to have.

The new equipment you desire for your mine. They're the things no man will overlook; the things that every man wants. Their acquisition is the motivating force behind our American life.

Effort, work, progress to the ultimate victory is our one and only ambition for the duration.

And for the duration we recommend that you conserve by properly maintaining all of your mining equipment. Should a breakdown occur as they sometimes will phone our Emergency Repair Department and a fully trained engineer will be at your service to get your mine back in operation with repairs and replacements at a speed that will cut your "time down" to a minimum.

Write today for our complete catalog of modern mining equipment.

**ROBERT HOLMES AND BROS.**

BINS - GATES - LOWERING SPIRALS - DUST-O-LATORS - SHAKING GATES

**DANVILLE, ILLINOIS**

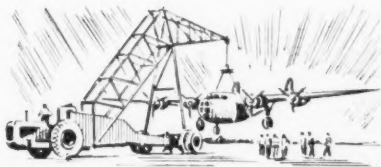




**"Hey, Joe! Spool  
that new line right  
the FIRST time..."**



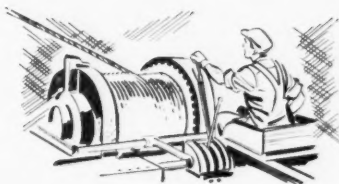
"YOUR UNCLE SAM'S AIR CORPS uses a lot of wire rope, Joe. Uses it right, too, because wire rope's got a lot of important jobs in this man's flying army: swinging half-ton eggs into bomb racks and towing planes out of hangars—big ropes for the cranes that "walk away" with damaged craft and fine cables for control in the air..."



Let's look at it this way: wire ropes, like people, pick up habits quick and easy, lose 'em hard. A wire rope's habits, in the Air Corps or any other place, begin when it's first spooled off the reel—and *bad* habits in a wire rope mean shorter rope life, sloppy service. When you spool a new line onto the drum, observe the following rules:

Wind the rope with *special care* the first time you do it. A little extra time spent

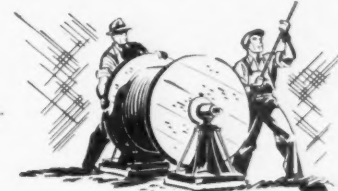
on the first wind will pay big dividends. *Guide the first layer carefully into place.* With a smooth-faced drum, this means to make each turn fit snug against its neighbor *without* interlocking of strands. For best results, the dead wraps must be wound tight against the drum face.



Be sure there's a brake on the reel. This provides uniform winding tension which produces necessary snugness and prevents rope damage due to over travel of reel. Mount the reel on substantial cribbing some distance from the drum so that rope pulls off the underside. If the reel must be placed close and the rope wound to top side of drum, the rope should pull off top of reel, but here special care is needed in braking the

reel to avoid upsetting. Be sure the rope lead from reel to drum is straight and unobstructed.

By following these simple rules in spooling new line, you'll be helping



that line to work better and longer. With Roebling "Blue Center" Steel Wire Rope, that means getting all the extra value built in by Roebling's 100 years of wire-rope engineering, means keeping that wire rope on the job for Victory.



JOHN A. ROEBLING'S SONS COMPANY  
TRENTON, NEW JERSEY  
Branches and Warehouses in Principal Cities

★ PROMPT SERVICE  
★ on essential orders  
★ from warehouse  
★ stocks or mill

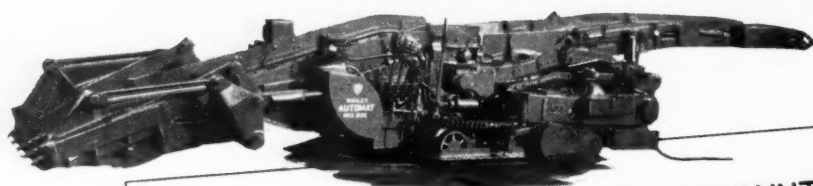


**ROEBLING**  
*"Blue Center"*  
**STEEL WIRE ROPE**  
PREFORMED OR NON-PREFORMED

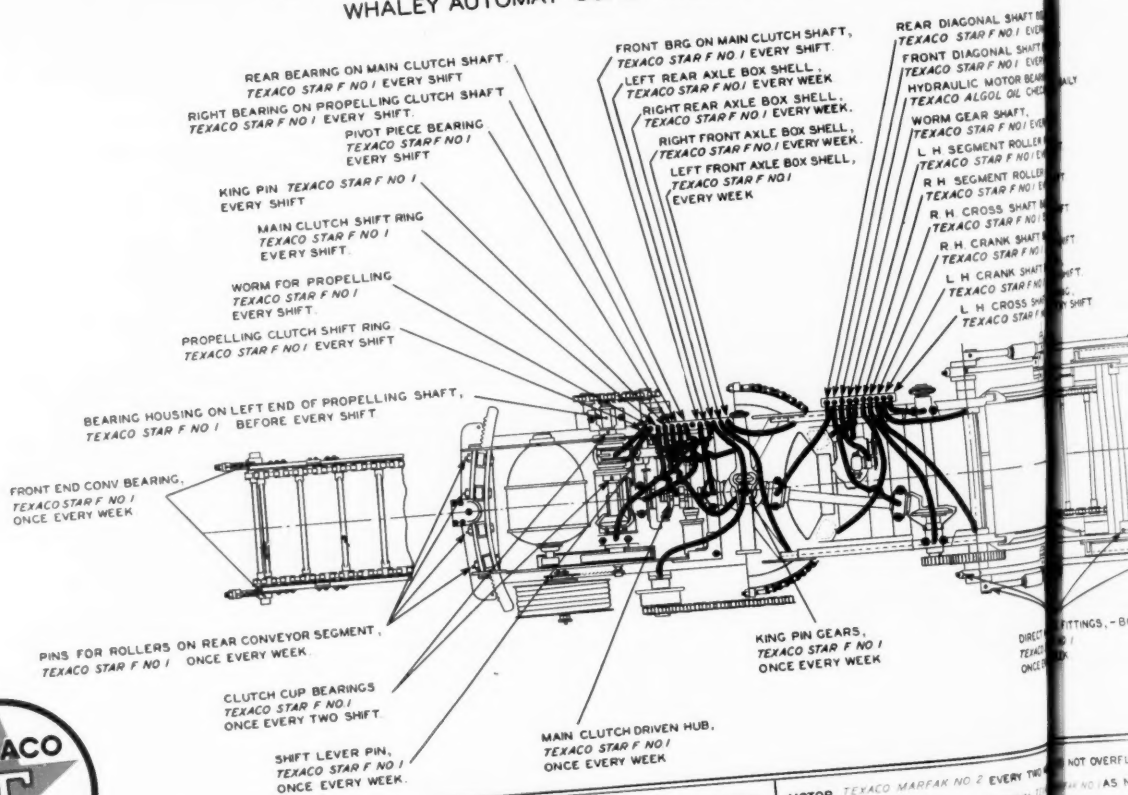


# War-time Maintenance

## TEXACO MAINTENANCE LUBRICATION



TEXACO MAINTENANCE LUBRICATION CHART  
WHALEY AUTOMAT COAL LOADING MACHINE



OPEN BEVEL KING PIN & PROPELLING REVERSE GEAR, TEXACO CRATER NO 2 AS NEEDED  
CONVEYOR FLIGHT CHAINS, TEXACO SUMMER BLACK OIL  
FINISHED ROLLER DRIVE CHAINS, TEXACO TEXOL'D WORK INTO JOINTS - AS NEEDED  
BEVEL GEAR HOUSING ON JIB, TEXACO MARFAK NO 1 PACKED  
BEVEL GEAR HOUSING ON MAIN FRAME, TEXACO MARFAK NO 1 PACKED

MOTOR, TEXACO MARFAK NO 2 EVERY TWO WEEKS  
CHAIN CASES FOR MOTOR DRIVE CHAIN, TEXACO MARFAK NO 1 AS NEEDED  
WORM GEAR HOUSING ON JIB, TEXACO MARFAK NO 1 AS NEEDED  
WORM GEAR HOUSING UNDER MAIN FRAME, TEXACO MARFAK NO 1 AS NEEDED  
HYDRAULIC SYSTEM, TEXACO ALGOL OIL AS NEEDED

CHARTS FOR UNDERGROUND MACHINERY ARE AVAILABLE

# TEXACO

# *begins with* **EFFECTIVE LUBRICATION**

**CHARTS NOW AVAILABLE for CUTTERS,  
LOADERS, LOCOMOTIVES**

**write for yours today . . . no obligation**

**T**HE LOSS of thousands of trained men to the armed forces places the coal industry in a very serious situation.

Obviously, one way to offset this shortage is to get more operating hours from your mining machines, keep them on the job longer, make them produce and handle more coal.

To do this, you must *lubricate* effectively . . . and Texaco Maintenance Lubrication Charts tell you *how*.

These charts show exactly how to service each lubrication point of specific makes and models of cutters, loaders, locomotives, and other underground machinery, with products approved by the manufacturer.

As designs change, revised charts will be available to you.

Order the charts you need by *make* and *model*, display them at all lubricating stations . . . and in this way assure yourself of less time out for repairs, maximum service life from expensive machines and replacement parts. Address The Texas Company, *National Sales Division*, Dept. C, 135 East 42nd Street, New York, N. Y.

## **MAINTENANCE LUBRICATION**

**FOR THE COAL MINING INDUSTRY**



# COAL MINES CUT ROCK DRILLING COSTS



↑ **DRILLING 7-FOOT** holes in very hard Pottsville conglomerate, CP-60 Drifters give more feet per drilling dollar. An unusually light, fast, and economical valve, with short travel and large bearing areas, gives long life, higher drilling speed, and lower air consumption. Bulletin 875 contains complete information.

**AN AVERAGE OF** → 22 holes to pull the cut is required in this hard rock. CP Drifters set new standards of drifter performance. Their low air consumption per inch drilled is outstanding. Renewable bushings at main wearing points.



← **CP-60 DRIFTER** is one of three models proving widely useful in mining. Identical in construction, and varying only in size, these three rugged drills meet every drifting need. Amazingly fast drilling speed. Low, flat lines without any projections.

**CP DRIFTERS GIVE MORE FEET PER DRILLING DOLLAR**

## CP-60 Drifter Favorite Model

**PENNSYLVANIA (CP)** — Where it is necessary to drill through rock to open up coal faces, operators find these CP Drifters time and money savers. Typical of their performance, is their employment in a Pottsville mine in the anthracite field to tunnel through very hard Pottsville conglomerate, requiring an average of 22 holes to pull the cut, average depth of hole 7'.

The 3½", 148-lb. CP-60 Drifter is recommended for hard rock and general mining, particularly for operations where it is desirable to standardize on one size of medium weight drill. The 3", 130-lb. CP-50 Drifter gives light weight, minimum air consumption, and one-man operation. For heavy drifting, tunneling in extremely hard rock, the 4", 207-lb. CP-70 Drifter is ideal.

**CHICAGO PNEUMATIC TOOL COMPANY**

General Offices: 8 E. 44th St., New York, N. Y.



↑ **ANOTHER WIDELY USED** CP rock drill is the CP-32 Sinker Drill. Weighing only 47 pounds, properly balanced, and easy to handle, CP-32 is ideal for brushing, taking up bottoms, or general utility drilling.

CHICAGO



PNEUMATIC

## ROCK DRILLS

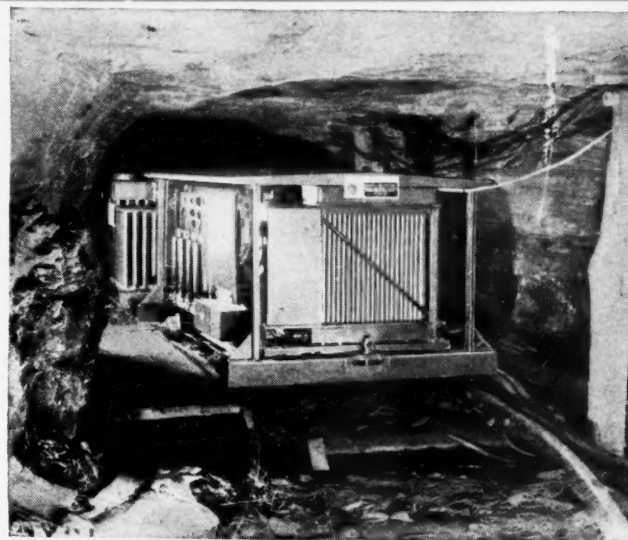
**ALSO: Air Compressors, Pneumatic Tools, Electric Tools, Diesel Engines, Hydraulic Aviation Accessories**

DRIFTERS  
MOTORDRIFTERS  
AUTODRIFTERS  
SINKER DRILLS  
STOPERS  
DIAMOND CORE DRILLS

# HOW PORTABLE, SEALED-IGNITRON RECTIFIERS

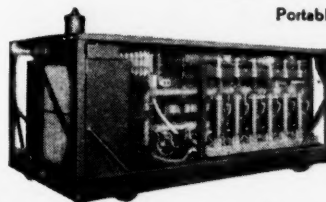
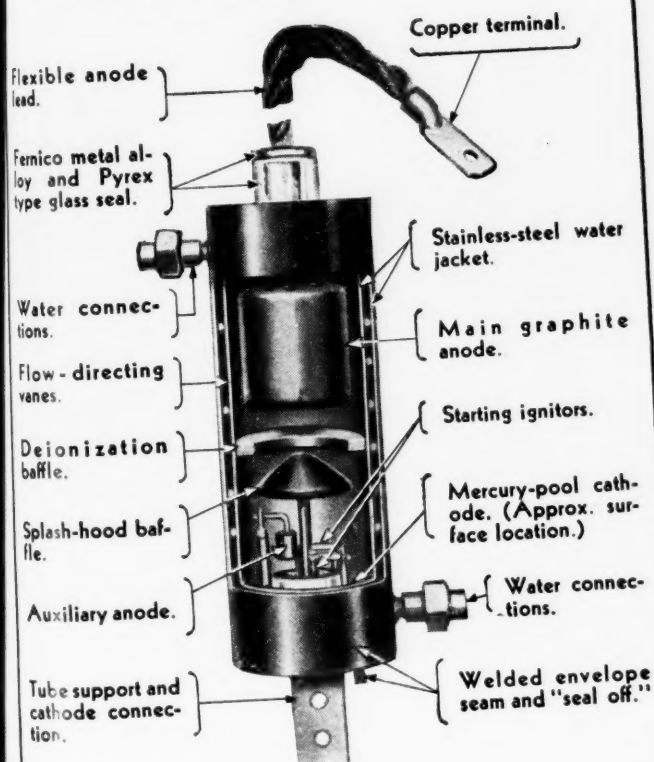
# REDUCE INVESTMENT *and* MAINTENANCE

**T**HIS high-efficiency, sealed-ignitron conversion equipment is less expensive than any other type of mercury-arc rectifier. In addition the *sealed* feature eliminates the need of bake-out equipment and evacuating pumps. • Maintenance is simple. No specially trained personnel is required. There are no major rotating parts. Since these ignitrons are permanently evacuated and sealed at the factory, difficult service problems underground are eliminated. • These sealed ignitrons are backed by a three-year warranty. A proved tubeless firing circuit is used. Over-all servicing time is considerably less than for other types of rectifiers.

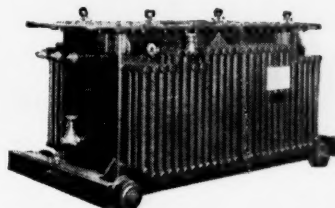


Portable sealed-ignitron-type rectifier underground at load center

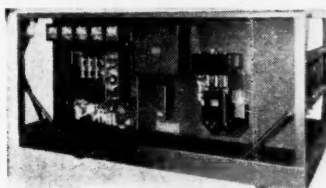
## G-E SEALED IGNITRON FOR POWER RECTIFIER



Car with rectifier, control, d-c automatic reclosing switchgear, and water-to-air heat exchanger



Car with Pyranol transformer. No vaults needed. Pyranol is General Electric's trade name for a nonflammable, nonsludging cooling and insulating liquid.



Car with automatic reclosing a-c switchgear. (Note that all three cars are roofed over to protect the apparatus.)

## Full Voltage at Working Face

This equipment is installed on three cars to provide greater mobility underground. In addition, all parts are completely accessible. The equipment is completely integrated—no interconnections are necessary. You run the cars into position at the load center, connect the a-c supply, and d-c power at full voltage is available. Efficiency is extremely high, light-load and no-load losses are very small. Fewer critical materials are used than in any other type of conversion equipment. **At present, delivery schedules are substantially less than those on rotating apparatus.** General Electric, Schenectady, N. Y.



The Navy "E", for Excellence, has been awarded to 92,780 General Electric employees in six plants manufacturing naval equipment.

**RATINGS FOR MINE SERVICE**  
150 kw to 500 kw; 275 volts to 600 volts d-c.

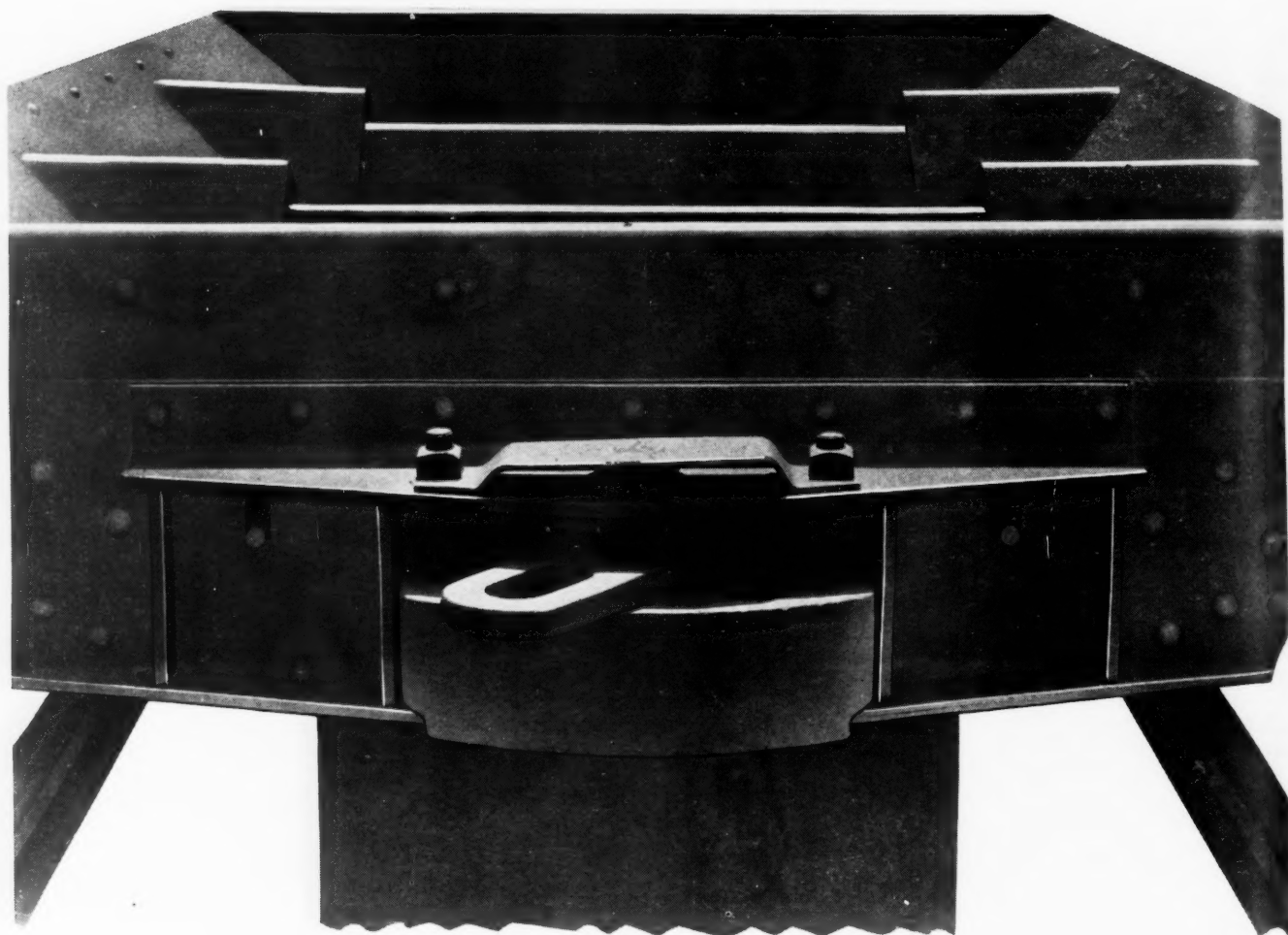
**GENERAL  ELECTRIC**

687-15-304

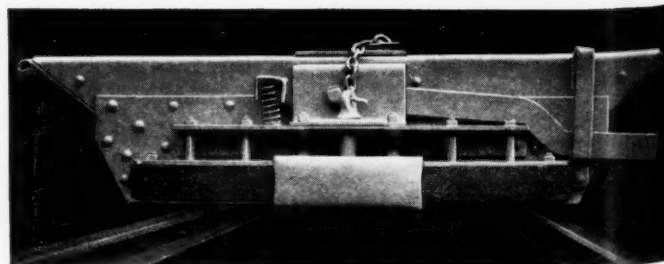


# Another Thrilling Improvement. A

Behold, the brand new S-D "NOCKOUT AUTOMATIC" car. It's a "NOCKOUT" in more ways than one. It works with the new S-D "NOCKOUT" door releasing mechanism. An operator now using 100 of these new cars along with old cars says it is the most outstanding improvement made since we designed the 1-2-3 door operating arrangement. It's a thrilling sight to watch these cars pass over the dumping bin.



Compare the old car with the new. The new car has no latch-lever mechanism. Nothing projects. Nothing on end of car to be damaged. Construction is simplified. Everything is fool-proof.



*Sanford-Day Iron Works, KNOXVILLE, TENNESSEE*



# As Usual S-D Keeps Ahead!

Since there are no lever bars to be tripped accidentally, the doors of the new S-D "Nockout Automatic" will never fall until the latch hooks are automatically disengaged by the nockout device at the dumping bin.

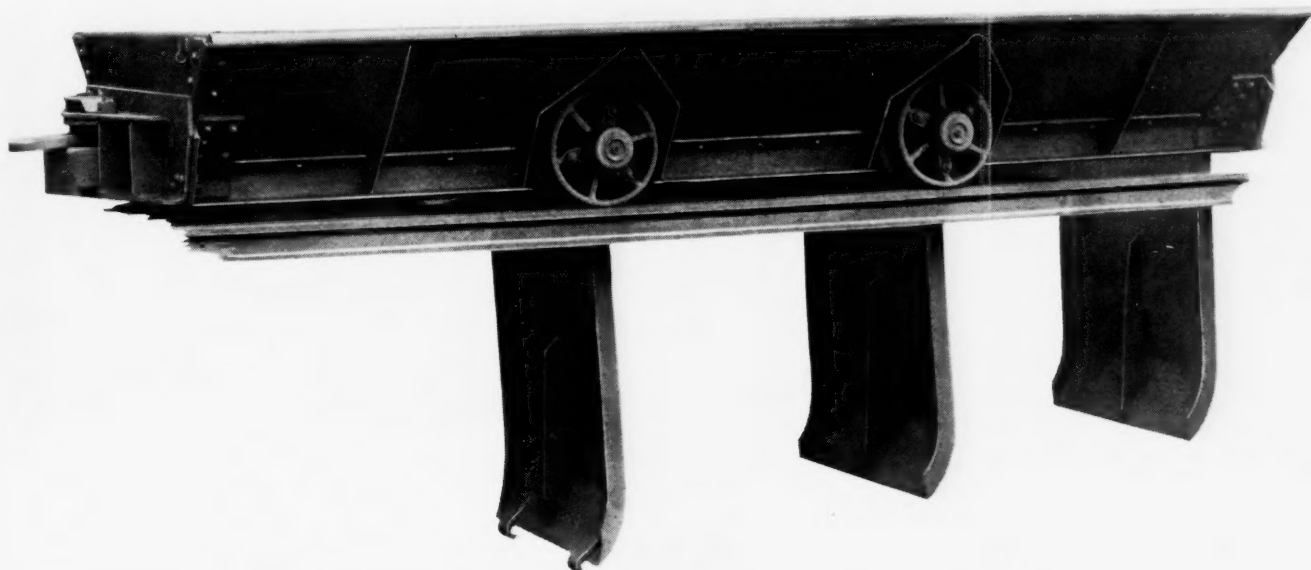
Also, two separately operating latch hooks are provided. This gives a double safety feature since both hooks must be released for dropping doors. The latch hooks are protected by the entire end sill structure . . . out of the way . . . out of trouble. No part of the

latch mechanism extends below the end sill structure. Thus it is completely protected.

No man needs touch a car at the dumping bin because everything is now completely automatic, safe and fool-proof.

Today you need maximum production, minimum man-power, and the least possible costs.

The new "Nockout Automatic" with the 1-2-3 door operation; with the greatest capacity for the same design in automatics, and with the least possible coal breakage, is the car you need to do this job.

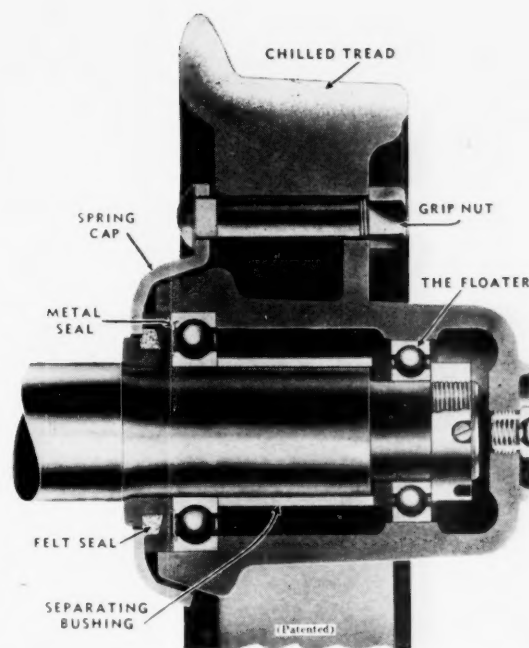


## AN UNBEATABLE COMBINATION

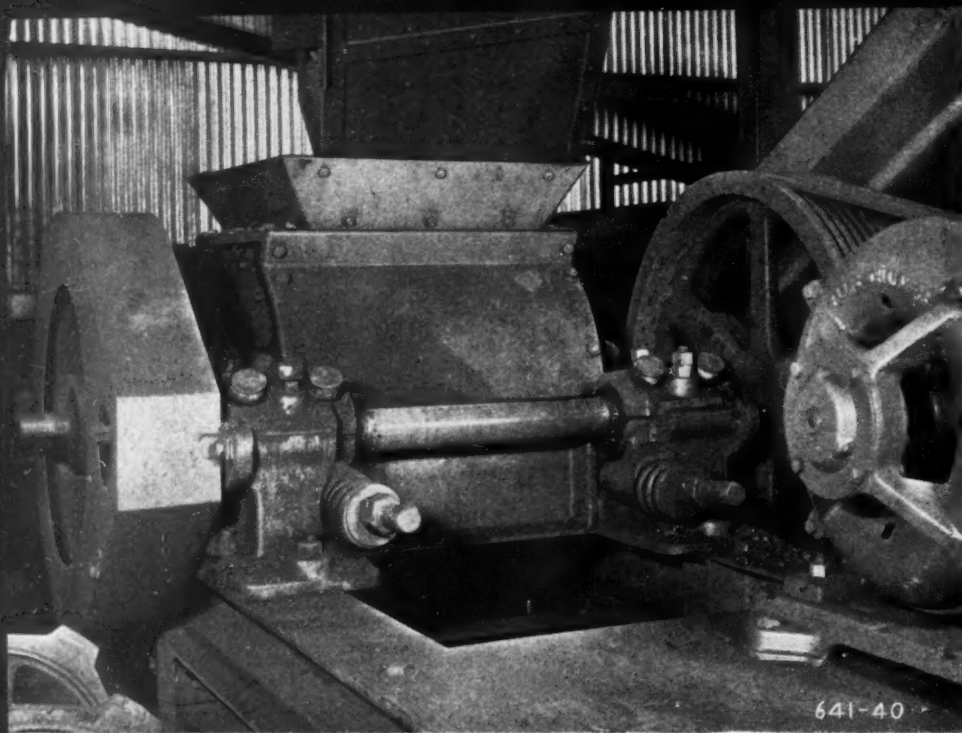
Here is the perfect combination; the S-D "Nockout Automatic" car; the S-D 1-2-3 drop-bottom doors; the S-D frame construction providing a large extra capacity for same over-all dimensions; and lastly, the famous demountable, fool-proof wheel with anti-friction bearings—either Ball bearing or Timken roller bearing.

In addition, you can pay as you go if you want to. Many large operators are renting S-D "Automatics". It pays them to rent rather than purchase as we doubtless can prove to you if you give us the opportunity. We always give you the option to purchase the cars whenever you want to. It's up to you to let us show you what we can do.

You want to make extra money and we want you to. We also want to make a few pennies. Write us and let's start working together now. A letter, wire or telephone call from you and our engineers will be on the job at once to show you how to make extra profits each year. Call us at our expense while you are now thinking about it. Good-bye and God Bless You!



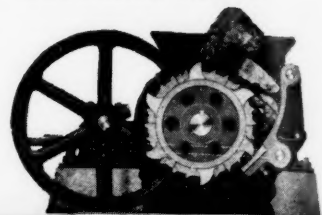
*Sanford-Day Iron Works, KNOXVILLE, TENNESSEE*



## SINGLE ROLL . . .

Nine sizes of single roll crushers for reducing large lumps to egg, nut and coarser stoker coal sizes in a single operation. Jeffrey crushers give you selective processing with minimum fines . . . sizes that are wanted when they are wanted.

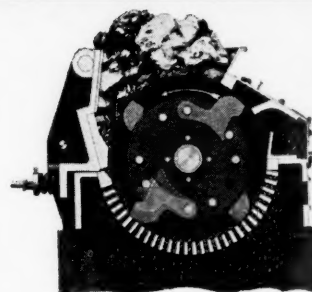
**FOR THE COARSER SIZES  
OF  
STOKER  
COAL**



# Crushers-



(Patented)



**FOR THE  
SMALLER SIZES OF STOKER COAL  
FLEXTTOOTH . . .**

Slow-speed 'Flextooth' crushers for reducing lump, egg, nut, or run-of-mine coal to a 100% —1" round product or in one operation—minimum fines. Cross-section above shows teeth in their outward or crushing position.

**The Jeffrey Manufacturing Co.**

912-99 North Fourth Street, Columbus, Ohio

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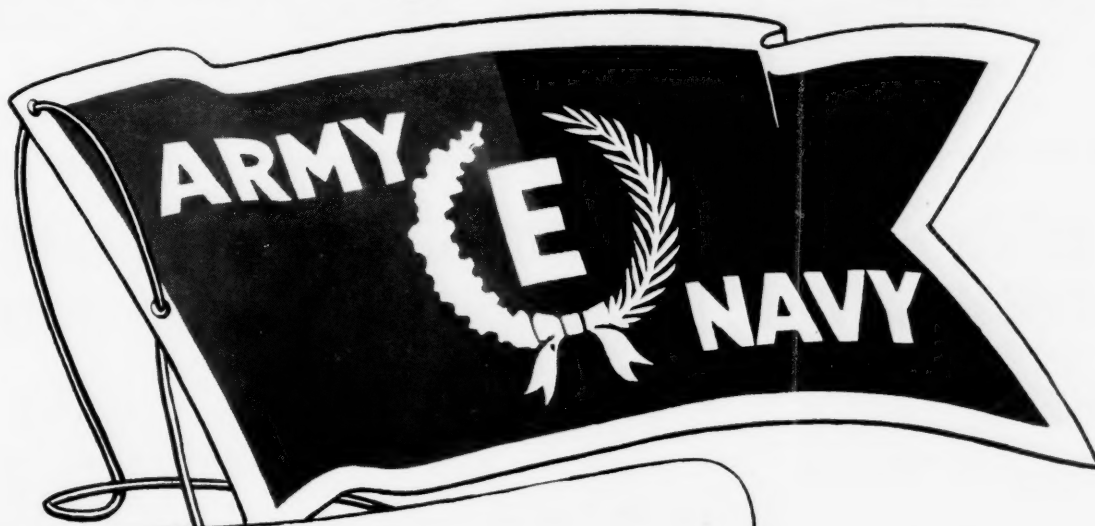
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**JEFFREY MATERIAL HANDLING EQUIPMENT**

***"This is only the first lap . . .***



*... the first lap of a race to produce enough war material to destroy our enemies before they destroy us. Until the race is won, our job is to keep turning out more and more electrical cables for the war effort. It is the job for which we are best equipped. And we're making every minute count."*



**Employees of Hazard Insulated Wire Works**

The Army-Navy "E" pennant we proudly fly tells the world that our plants are running day and night to meet the demands of our armed forces for insulated wires and cables. It means, too, that we cannot always fulfill the needs of our other customers on time — yet we are doing everything in our power to help them. But winning the war *must* come first.

3145

**HAZARD  INSULATED WIRE WORKS**

**DIVISION OF THE OKONITE COMPANY**

**Wilkes-Barre, Pennsylvania**

**Offices in Principal Cities**

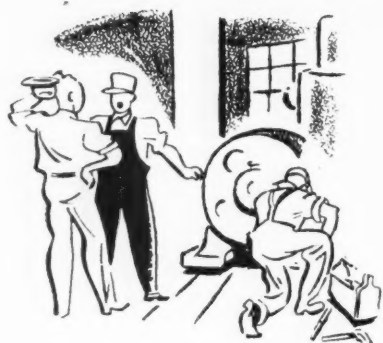
**BUY U. S. WAR BONDS — Every Payday All Hazard Employees BUY U. S. WAR BONDS**



# What's Your No

Here are 6 of the Most Important

## 1 UNEXPECTED BREAKDOWNS?



How many of your key machines were designed for 24-hour-day service?

## 2 LOW-GRADE DEPOSITS?



Has increased wartime demand brought new processing problems?

## 3 LABOR SHORTAGE?



Does part of your process use men unnecessarily? Mining is a machine industry!



In modern laboratories trained engineers analyze materials on machines like this X-ray spectrograph — there's no guesswork when you come to Allis-Chalmers.

WHICHEVER  
IT IS —

# CALL ON

HERE'S SOMETHING for every coal operator to lean on these days — and lean on *hard* . . . Allis-Chalmers Cooperative Engineering. There's nothing else like it! Here's why . . .

Because it's hard to get new machinery these days, often old equipment must be made to do the job. And that's where Allis-Chalmers' vast experience and "know-how" can help you. Making all types, complete lines of equipment, our engineers analyze your problem from the viewpoint of your entire production process.

That means that Allis-Chalmers engineers are

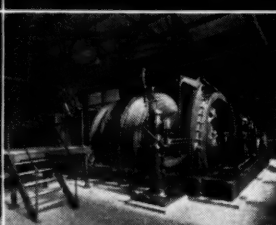
*Only  
Allis-Chalmers  
Makes  
a Complete Line  
of this Equipment!*

### Vibrating Screens



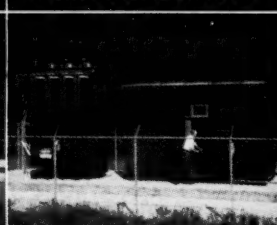
Efficient separation and de-watering — 8 different types.

### Mine Hoists



Completely automatic control with new "REGULEX" exciter.

### Unit Substations



Modern, factory-built units save space, copper, steel.

### Turbines



Steam & hydraulic. Line of power, electrical equipment.

# 1 Headache?..

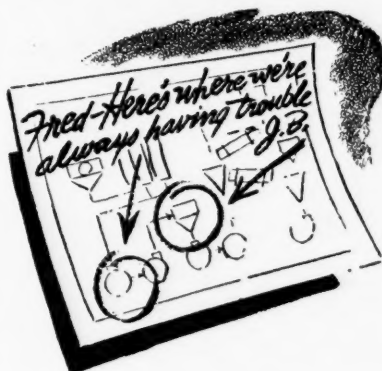
Problems facing Processors today —

## 4 LAGGING SCHEDULES?



Maybe you have a bottleneck machine—an added machine would load up other units.

## 5 OBSOLETE MACHINERY?



Much equipment that "got by" in peacetime needs too much maintenance today.

## 6 OVERWORKED ENGINEERS?



Outside engineering cooperation may be all that's needed to get you out of a hole.

# ALLIS-CHALMERS!

"complete line" engineers . . . familiar with every step in the basic processes. They know how vital it is for various machines to team-up properly — and know how to *achieve* that team-work!

And they don't have to push any one type of equipment . . . because Allis-Chalmers builds *all* types — *eight* types of screen, for example, not just one or two types!

Result: Allis-Chalmers engineers have the same point of view as *your* engineers. Their objective is to give you precisely *the* right equipment for your particular needs!

Whether you have a big or a small problem, Allis-Chalmers Cooperative Engineering is yours for the asking — with no strings attached. Write, wire or 'phone your nearby Allis-Chalmers district office. Or write ALLIS-CHALMERS MFG. CO., MILWAUKEE, WIS.

A 1561-D

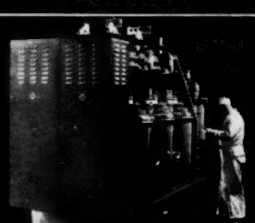


### Tractors



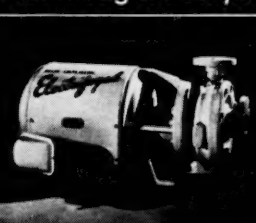
Crawler and wheel types for both hauling and stripping.

### Rectifiers



Low-loss conversion of a-c into versatile d-c current.

### Centrifugal Pumps



Largest line, highest efficiencies — built with motors.

### Texrope Drives



Save critical materials by use with high-speed motors.

### Electric Motors



1/2 hp to 5000 hp — a-c and d-c — all types with control.

# *Universal* OPERATION

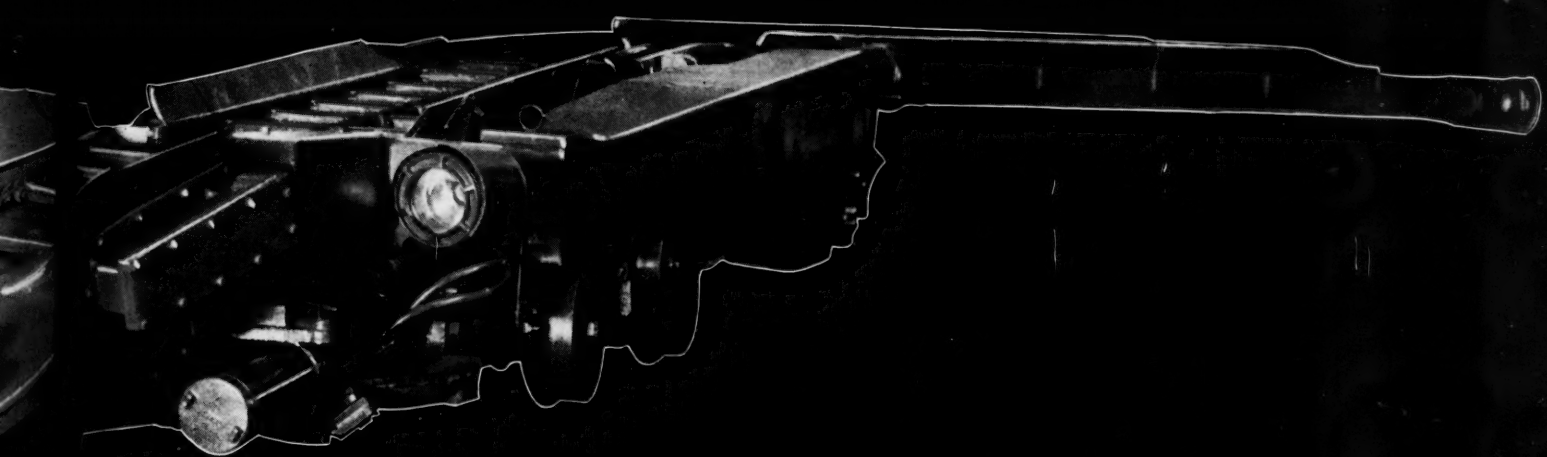
**CLARKSON**  
**LOADER** 24 BB  
TRACK MOUNTED



*The* **CLARKSON**



**IN LOW COAL  
AS WELL AS HIGH . . . .**

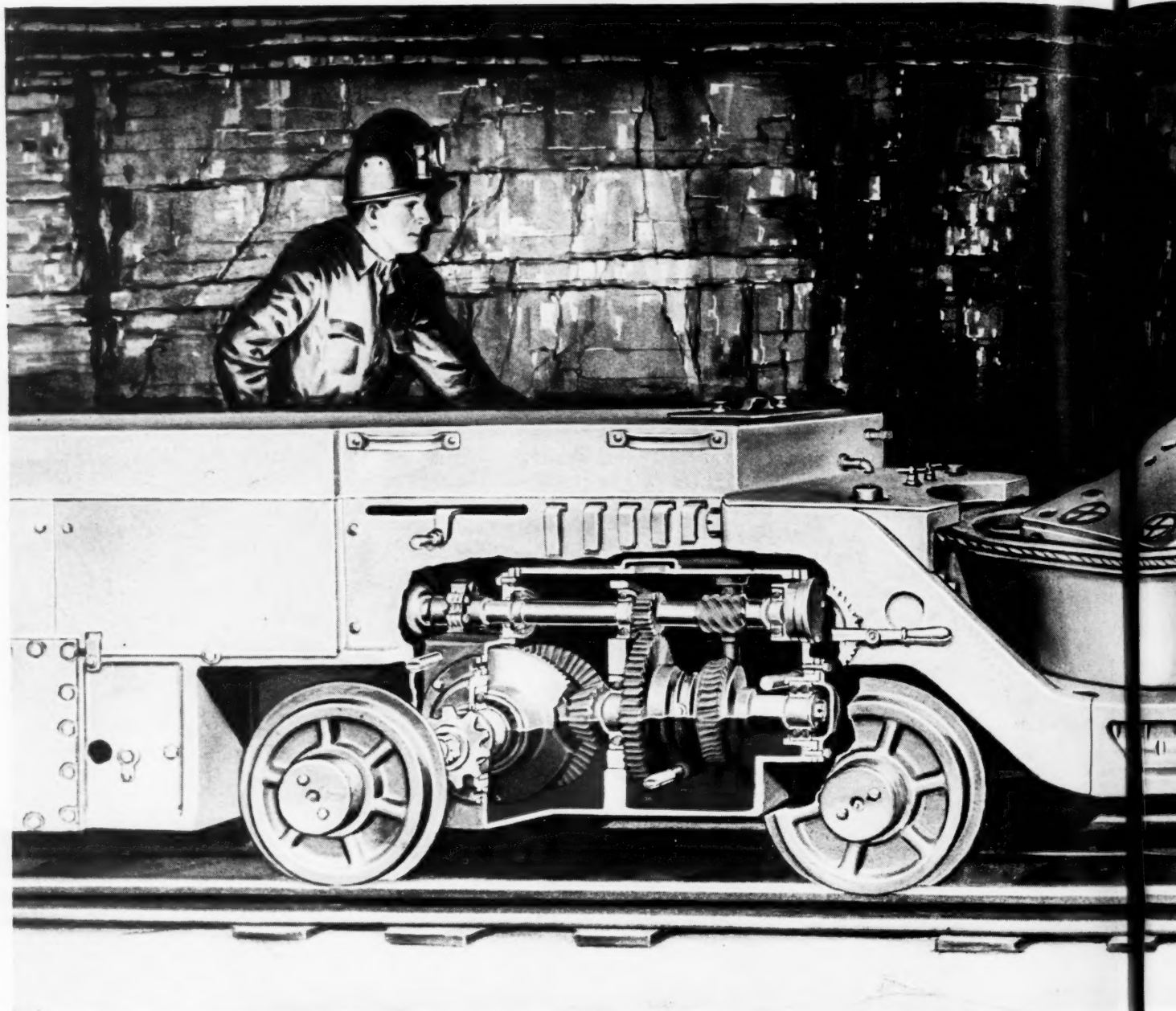


**LOWEST LOADING MACHINE ON WHEELS**

**D**oes that bigger job so important today — does it easier, faster, and at less cost — digging head digs out those tight shots perfectly — operated from one central point — highly flexible — rugged — vertical or horizontal adjustment.

**MANUFACTURING COMPANY NASHVILLE  
ILLINOIS**

# One Important Aid to Keeping C



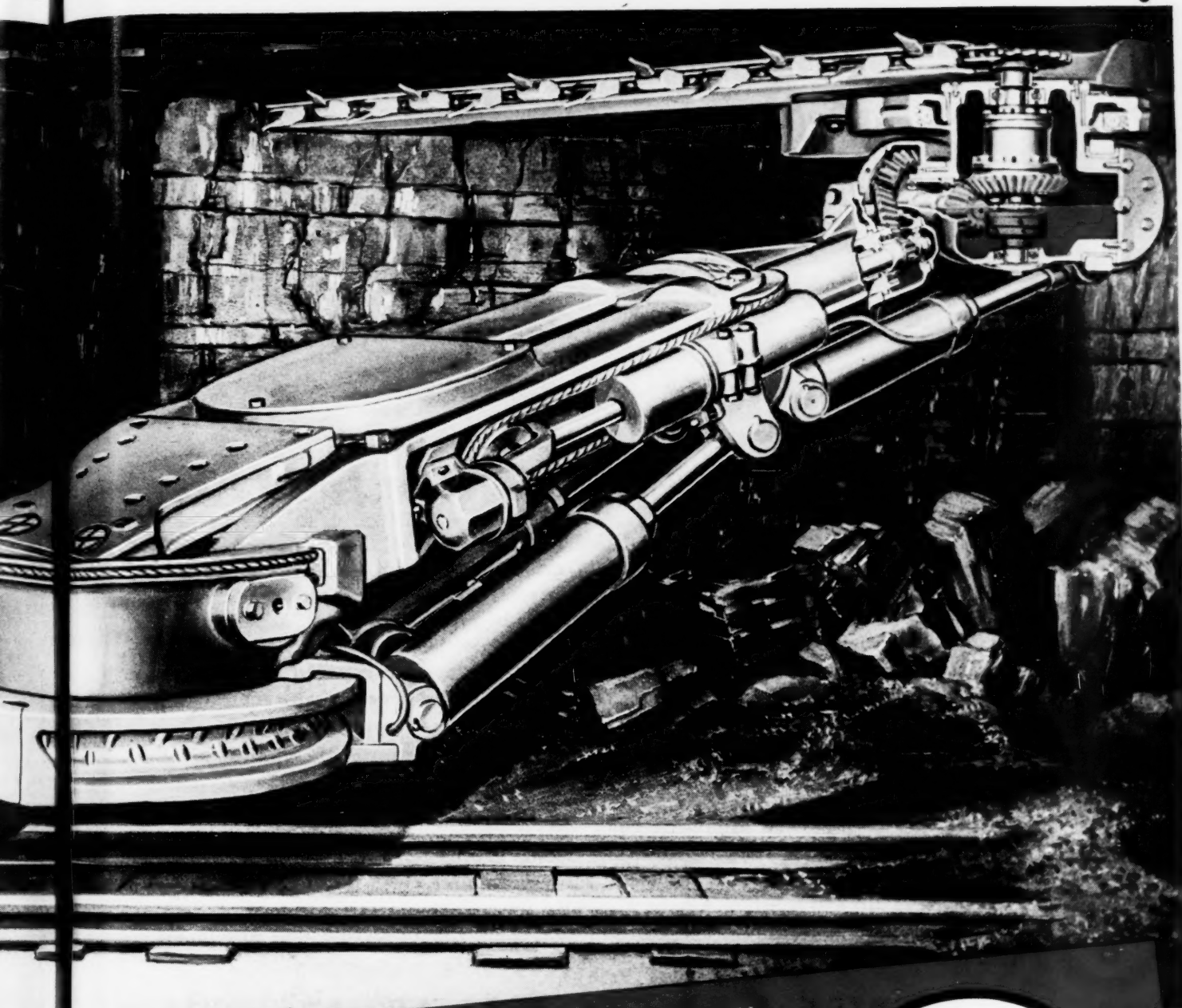
## READ HOW THE SOCONY-VACUUM MAN IS PREPARED TO HELP YOU MAINTAIN FULL-TIME CUTTING:

***Problem:*** There's only one way coal cutters can pay their way and earn profits for mine operators — by sticking on the job, shift after shift, with minimum time out for maintenance and repairs.

These cutters are subject to heavy pressures and shock loads. They operate in dusty and often damp surroundings. Hydraulic systems, bearings and gears must have correct oils or greases to minimize machine wear and maintain maximum operating efficiency.

***Answer:*** The Socony-Vacuum man who visits your mine is trained to study your specific operating problems and to recommend Gargoyle Lubricants for each need. He has at his disposal a complete line of coal mine lubricants — a line which includes a correct oil or grease for every machine you operate. These lubricants help keep mining machines at the "face" through long periods of service uninterrupted by frequent time outs for maintenance and repairs.

# ing Cutters on the Job\_



TO HELP MAINTAIN WARTIME PRODUCTION, CALL IN  
**SOCONY-VACUUM**  
for "Correct Lubrication"

SOCONY-VACUUM OIL CO., INC. — Standard Oil of N. Y. Div. — White Star Div.  
Lubrite Div. — Chicago Div. — White Eagle Div. — Wadhams Div. — Southeastern Div.  
(Baltimore) — Magnolia Petroleum Company — General Petroleum Corporation of Calif.







## Plenty Tough . . . *but it still needs Lubrication*

Wham! The bouncing jeep refuses to be stopped. And one big reason is: The boys keep it in fighting trim with *regular* lubrication. Give your wire rope the same care and its resistance to destruction will also be something to talk about.

When wire rope leaves the factory it is lubricated clear through. Inside wires bear on each other with minimum friction as they bend around drum or sheave. If it's a hemp center rope, the saturated core feeds more lubricant to wires and strands as loads are applied. The lubricant on outer wires checks dirt and moisture, too.

But weather, pressure, heat and corrosion will eventually exhaust the protection

unless the lubricant has been *renewed* in time. A dry core or rusted inner wires won't be visible to the eye. So, if it's sound to "grease" jeeps and trucks at stated intervals in order to *prevent* damage, it's sound to do the same for wire rope.

A good lubricant penetrates to the core and still has viscosity to cling to individual wires. Major oil companies make excellent products for this purpose. Get a supply and use it regularly. If you wish detailed lubrication instructions or any other assistance in conserving rope, feel free to call on B & B engineers. Remember . . . Uncle Sam will thank you for making your wire ropes *last longer*.

### **BRODERICK & BASCOM ROPE CO., ST. LOUIS**

Branches: New York, Chicago, Houston, Portland, Seattle

Factories: St. Louis, Seattle, Peoria



**YELLOW  
STRAND  
PREFORMED  
WIRE ROPE**



A MAINSTAY OF

WAR PRODUCTION



## Call Scully for NATIONAL EMERGENCY ALLOY STEELS

TO save critical materials such as nickel and chromium, "National Emergency Alloy Steels" have been developed as substitutes for the old style alloy steels. These new alloy steels cover a wide range of properties and were especially designed to meet present conditions. Many of them are actually out-performing the steels previously used.

Our stock of these "National Emergency Alloy Steels" is now coming in. We welcome your inquiries and orders and would be happy to assist you in determining the grades best suited to your needs.

Telephone, wire or write the Scully Warehouse nearest you—see phone and teletype numbers above.

Do you lack steel to complete a rush war job? Is your production in danger of being slowed down or stopped for want of some piece of steel or steel product? Then call the nearest Scully warehouse. Many such calls have kept wheels turning. If we don't have what you need, you can be sure that we'll do everything possible to help you get it.

Our first job, like yours, is to speed war production. Every one of our warehouses is on the job day and night. And although our stocks of steel are not what we wish they were, what we have can be yours in a hurry—subject, of course, to priority restrictions. So try Scully—note our phone and teletype numbers above.

### SCULLY STEEL PRODUCTS COMPANY

*Distributors of Steel and Steel Products*

Warehouses at CHICAGO  
ST. PAUL-MINNEAPOLIS

NEWARK, N. J.  
CLEVELAND

ST. LOUIS  
PITTSBURGH

BOSTON  
BALTIMORE



# UNITED STATES STEEL



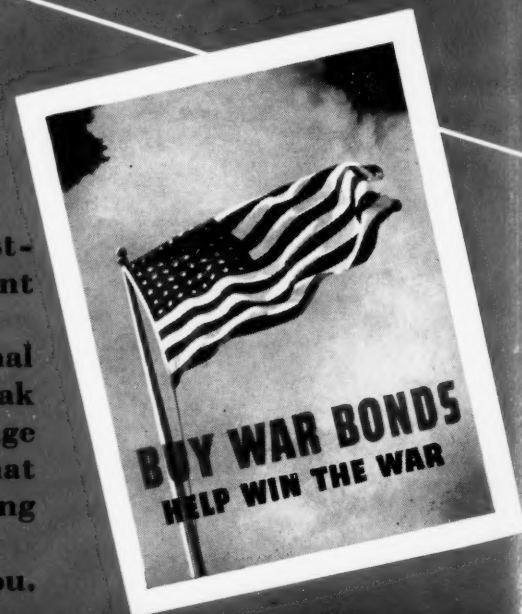
# **YOU CAN PRODUCE MORE COAL AT LESS COST WITH JOY EQUIPMENT**



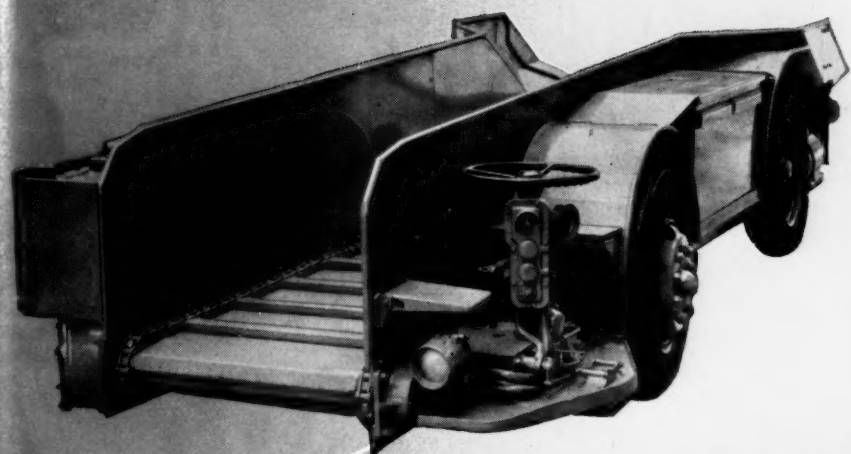
In Peace time the economic basic rates of cost-per-ton and tonnage output is of paramount importance.

With the Nation at war—with our national future at stake, and coal, the vital weapon, in peak demand—the question of low-cost, top-tonnage output demands urgent attention. Mines that are Joy-equipped are modern mines—meeting today's needs with today's tools.

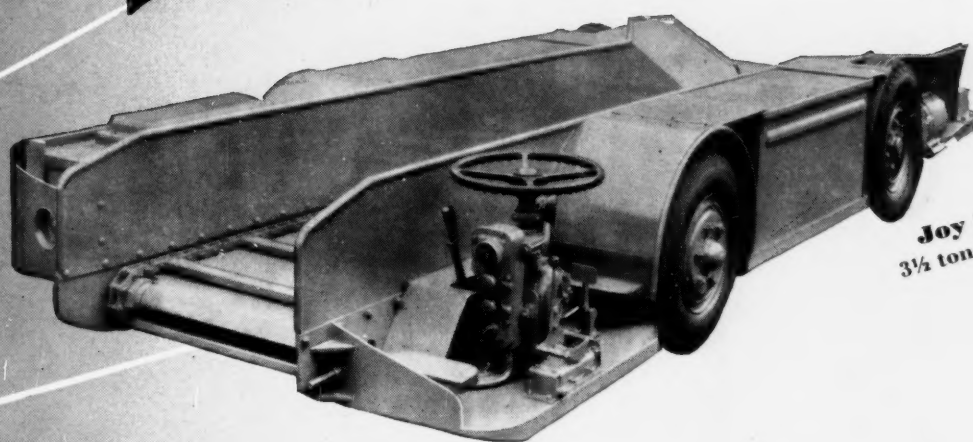
Joy Engineers will be pleased to confer with you.



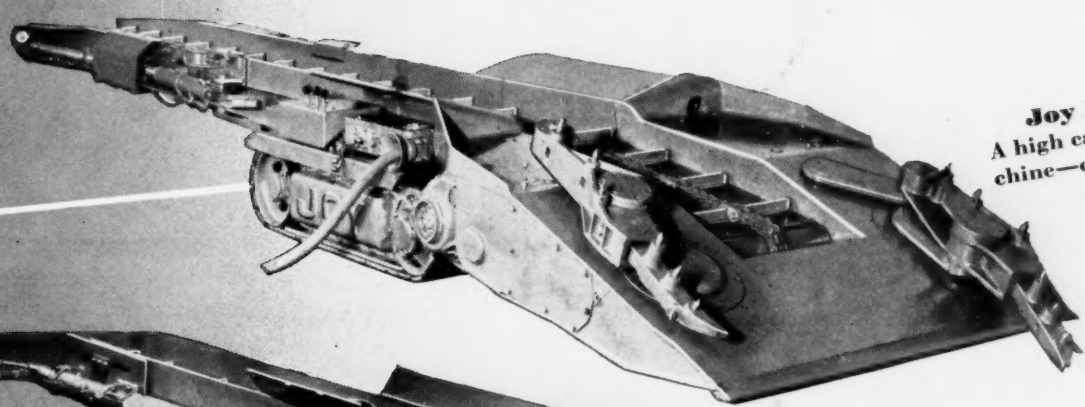




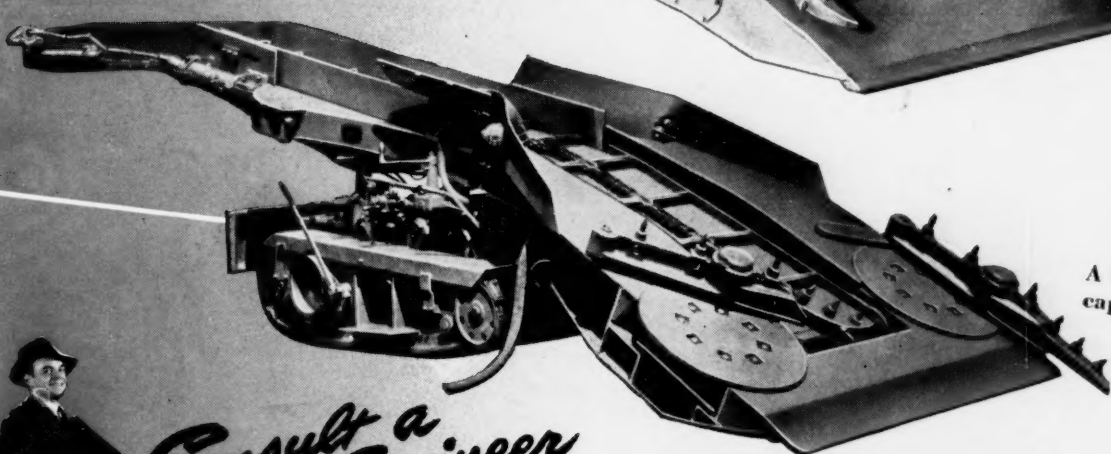
**Joy 42" Shuttle Car**  
6 ton capacity for high seams.



**Joy 32" Shuttle Car**  
3½ ton capacity for low seam operations.



**Joy 14-Bu Loader**  
A high capacity low vein machine—only 26" high—5 tons per minute.



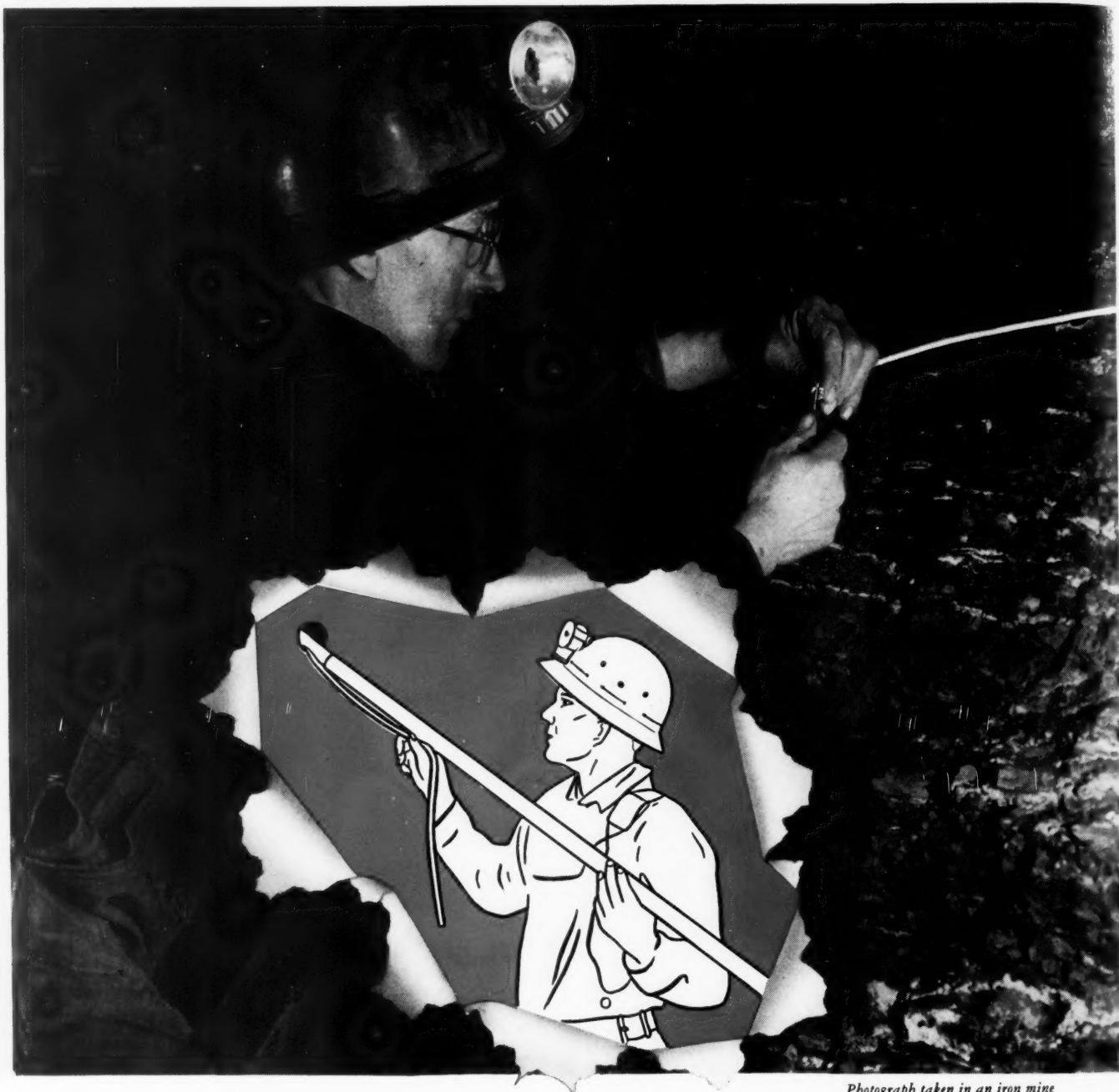
**Joy 11-Bu Loader**  
A heavy duty machine of high capacity, 8-10 tons per minute.



*Consult a  
Joy Engineer*

**JOY**

**MANUFACTURING CO., FRANKLIN, PA.**



Photograph taken in an iron mine

## A little more fuse is a lot more safety

Don't take chances with fuse too short for the job. When the cartridge is in place, see that the fuse extends *well beyond* the mouth of the bore hole. Allow ample opportunity to light it carefully and *walk* leisurely to a safe place. It costs *less* to use *more* fuse! A little more than is absolutely necessary helps prevent costly accidents.

For better results in blasting, use Ensign-Bickford Safety Fuse. There's a brand designed to meet the conditions in your mine.



**THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONN.**

*Manufacturers of Safety Fuse since 1836—also Primacord-Bickford Detonating Fuse*

SF-130

# ENSIGN-BICKFORD SAFETY FUSE

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# Construction—Builder of Bases

*America's Great Peacetime Industry Goes to War*

---

**P**UNCHED through 1,600 miles of trackless wilderness and rivaling the Panama Canal in strategic importance, the Alaska Highway will cut days and dangers from present supply routes . . . to Alaska . . . to the Aleutians . . . yes, to Japan itself!

This job, to be finished soon and well ahead of schedule, is but one example in thousands illustrating how construction sets the stage for our war effort . . . and why the construction engineer is vital to victory.

Back of America's busy production lines, expanding shipyards, growing cantonments and far-flung military bases is a series of swiftly executed construction jobs. Important jobs! *For the construction industry is a builder of bases. Bases for production—for training—for defense—and for attack.*

To conceive and to carry through so tremendous a program in a race against time is typically American. It requires enterprise and the sort of versatility that has been acquired by undertaking every kind of job; from a Boulder dam to a drydock, from a Pennsylvania Turnpike to a housing project, from a Radio City to a railroad tunnel . . . and taking it in stride. War's demands in the eyes of America's construction men, are simply more of the same—for a grimmer purpose, and under heavier pressure.

The civil engineers who develop the necessary designs, the contractors who execute them and the manufacturers who provide the equipment and materials, are as much a part of this war as are the men who face the enemy. The results of their labors are recorded in mounting production figures, and will be indelibly written in the military annals of this war. Those 60,000 airplanes, 45,000 tanks and 8,000,000 tons of shipping that the President asked for in 1942 will be supplied because—and only because—the construction industry did a Herculean plant-building job first—and fast.

Yes, construction, America's great peacetime industry, has gone all out for war. From a normal 6½ billion dollars in 1938, it got into its war stride last year with a 11½ billion dollar volume. And under the impetus of Pearl Harbor, the 1942 figure now promises to reach the unprecedented total of 15 billion dollars. "If buildings would win the war, Hitler would be licked now", said Lieut. Gen. William S. Knudsen recently. Which emphasizes the further fact that the construction industry was the *first* to go to war.

The technical and managerial talent that is accomplishing this mammoth job has had to find its strength and resources within itself. No possibility of "conversion" here! Only years of varied construction experience enabled it to tackle and to achieve the manifold tasks that building for war demands.

Take that cornfield, for instance, that Henry Ford picked for his record-breaking bomber plant. The spring mud was soft and deep when contractors moved in last year. They were entering a race against an almost impossible time limit. Before they could even begin on the plant itself, they had to build roads, lay a 4-mile water supply line and install a complete sewerage system with its disposal plant. But such varied jobs—each big in its own right—merely were antecedent to running up the framework and enclosure for the 60-acre factory itself. Or to

using road-building methods to pave a floor that was the equivalent of 25 miles of 20-foot wide concrete highway.

It was a race against the approaching winter, and to win it they had to push their \$1,000,000 worth of construction equipment to the limit—day and night. But win they did! It is accomplishments like these that explain how the nation's aviation factory floor space jumped from 18,000,000 to 60,000,000 square feet in

*This is the fifth of a series of editorials appearing monthly in all McGraw-Hill publications, reaching more than one and one-half million readers, and in daily newspapers in New York, Chicago and Washington, D. C. They are dedicated to the purpose of telling the part that each industry is playing in the war effort and of informing the public on the magnificent war-production accomplishments of America's industries.*



the past two years . . . why Fortresses and fighter ships are beginning to turn the scales of war in our favor.

"Somewhere in the Southwest" the Army called for a training base. The contractor who answered that call summed up his performance in characteristic fashion: "Beginning without so much as a contour map we had a \$10,000,000 project ready for operation within 90 calendar days, and saved 3½ million dollars of the estimated cost".

At another Army camp a contractor assembled a crew of 20,000 men who put together 1,400 buildings in 125 working days, along with a sewer system, a water-supply and a street layout of which many a fair-sized city might be proud. This job swallowed up 2,000 carloads of lumber, and 26,000 kegs of nails. So perfect was the teamwork, from the general manager down through the hundreds of superintendents and foremen to the specialized crews, that as many as seventy buildings were erected in one single day.

But versatility and experience are not the only qualities that the construction engineer has in his tool chest. He has ingenuity, and he needed it when steel, copper, zinc and aluminum had to be used for combat equipment, and were denied him. Great hangars, conventionally of structural steel, were turned out with record-breaking timber arch spans. Reinforced concrete factories were designed to require only 3 lb. of steel bars per square foot instead of the customary 5 lb. Asphalt-impregnated paper was substituted for copper in flashings, cement-asbestos for galvanized steel in duct work. In the face of a materials shortage, he continued to build bases—safely, economically, and on time.

Construction ingenuity, too, is back of the records in Liberty ships, in war housing and a host of other facilities. Indeed, it was the construction industry that stepped forward to assume the bulk of the emergency shipbuilding program, leaving established yards free to handle more specialized Navy work. Naturally, it was easy for civil engineers and contractors to build the shipyards, but building ships was another story. It is a far cry from steel ships to conventional engineering structures, yet, drawing upon their bridge and building experience, the men of construction have turned out ships faster than they were ever built before.

How was this possible? . . . because the construction man sees every job as a new problem, views every precedent as something to be discarded in favor of something better. So instead of assembling the myriad separate pieces of each ship on the ways, he fabricated them into huge built-up sections. These he swung to the ways and welded them into place in a fraction of the time required by old methods.

Again, the demands for wartime housing for workers in industrial areas, at Navy bases, and near Army concentrations, have altered the meaning of "residential construction". The building of individual houses has

given way to a form of multiple-unit project that calls for the skilled services of the architect, the civil engineer and the large contracting organization. On one such project, for example, a contractor experienced in large building and bridge construction employed an extensive system of prefabrication and site assembly that made possible the completion of 5,000 houses for war workers within five months.

All these activities, within the United States, parallel the achievements of other industries that serve the men at the front. But construction knows no continental limits. Its men are serving throughout the network of defense bases built in the West Indies, Greenland, and Iceland, and in the offensive bases that are taking form in the jungles and deserts of Africa, the harbors of the Persian Gulf, and the plains and mountains of Australia and Alaska. Already in this war, as in the last one, construction crews, like those at Wake and Guam, have dropped their peacetime tools to fight shoulder to shoulder with their comrades in uniform. Construction follows the flag to the farthest outposts in this global struggle.

\* \* \* \*

But while the construction industry thus serves the special needs of the armed forces, it must look after its job at home. It must keep the highways serviceable, the water supply safe, sanitary facilities adequate. There are home chores that cannot be neglected even in war.

And when we finish our No. 1 task of winning the war, the construction industry will again be called upon to help re-establish peacetime employment and to stimulate the normal industrial activities of the nation. It will raze, redesign and rebuild; it will bring modern sanitation to urban dwellers; it will safeguard fertile areas and cities from disastrous floods; it will improve all forms of transportation; it will design and build the facilities that will be needed to reconvert from war to peace. Its vision, versatility, experience and ingenuity will be as indispensable then as they are vital now.

Today it is building the bases that are needed back of every battle-line. Tomorrow it will build for a new and better era. Today it is laying the foundation for the victories that must be ours. Tomorrow it will lay the foundation for the peace that will follow these victories. In war and in peace the construction industry is the builder, the harnesser of nature's forces.



President, McGraw-Hill Publishing Company, Inc.

# COAL AGE

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

NOVEMBER 1942

## THE JOB AHEAD

PRELIMINARY estimates recently released by Solid Fuels Coordinator Ickes indicate that the requirements for bituminous coal will total 600,000,000 tons in 1943, plus 60,000,000 tons of anthracite. If such should prove the case, it looks like a sizable job ahead, although there is good ground for belief that the industry can do it, with provisos. One is a continued flow of materials and equipment in the necessary volume. This has been promised by the appropriate officials in the War Production Board.

The other major factor is manpower. The action of the United Mine Workers in approving a long work week is a big step in the right direction. The longer week undoubtedly will be a great immediate advantage to the industry, but even if the need were not critical at the moment this relaxation in restrictions would be a nice ace in the hole. Perhaps it might be well to go farther and arrange to work 48 hours when conditions warrant.

With even the best possible break on materials and manpower, however, it seems that action will have to be taken on all possible fronts where hitches might occur in the production, preparation and shipping of coal. In fact, a general tightening up all around is indicated. Now is none too soon to start thinking about the task before the industry and how best to discharge it.

## ORGANIZATION

COMING up in 1943, among other things, will be new wage contracts. A look forward leads almost inevitably to the question of how well the operators are prepared to enter the negotiation period. Arriving at the most equitable contract, of course, is the object of such negotiations, but if one side is ill-prepared, both with facts and a smoothly operating organization with the requisite powers, the chances of arriving at an equitable agreement are correspondingly reduced.

The showing made by the operators in the last negotiations, candor compels saying, was not too good. How they will function in the next sessions will depend upon

the extent to which facilities for fact-finding and for appointment of negotiating committees with the necessary powers have been developed by that time. It is obvious that the operators' organization and procedure should be at least commensurate with that of the union. If not, there is no time like the present for making it so.

## EXPLOSION WEATHER

FIRE, gas and dust, as sad experience has demonstrated over and over, can wreak havoc in a coal-mining operation when the proper combination of elements occurs. Perhaps the most deadly combination is the electric arc and gas, in which dust usually is soon involved in bituminous mines. The arc and dust alone is the runner-up. As the air dries out, the possibility of the occurrence of the right combination of elements is increased. Cold means dryer air and winter weather therefore could well be called "explosion weather." Consequently, a drop in temperature should be the signal for an intensification of explosion-prevention work.

An explosion, it will be recalled, can take place only when the right combination of elements occurs. If there are no gas or dust, or if the gas is diluted and the dust is rendered sufficiently inert, the possibility of an explosion is almost nil. One of the first lines of attack, therefore, is plenty of air; not alone in the mine but at the face. Another is elimination of all dust possible and rendering the rest incapable of exploding—meaning, among other things, sprinkling and rock-dusting. This does not exhaust the list of precautions which might be taken and none should be neglected as we enter another season of "explosion weather."

## FIT THEM IN

WAR necessarily brings changes, these changes affecting coal mining as well as all other activities in life. A major change in coal mining is in the manpower picture, not only from the standpoint of actual numbers available for work but also in other respects. First, the average age of mine employees is increasing as younger

men are called into the armed forces. Second, new men, both young and old, are being employed, where possible, to fill the gaps. A third possibility is the employment of women—so far, not many—where safety and health regulations and the character of the jobs permit them to do the work.

The older man is a familiar and valued worker at many coal mines, but the question arises as to whether he always is given an opportunity to do his best work. On the basis that he isn't as fast on his feet, either physically or mentally, he frequently is relegated to the simpler and more routine jobs. But, since the older man will be with us for the duration, if not longer, now seems a good time to test him out—for necessity, if for no other reason. Perhaps a change in thinking, supplemented by changes in methods, where necessary, to enable him to perform most efficiently, plus a pat on the back, might yield unexpected dividends. At least, such steps should not be lightly dismissed from consideration.

New men pose both acclimatizing and training problems. Some coal companies are in them up to their necks. Others have had little trouble from manpower shortages and consequently have not encountered these difficulties. But they may be expected to grow and today is none too early to develop an acclimatizing and training program. A major feature of such a program should be training in safety. One of the biggest factors in safety results is cultivation of the proper working habits. Proper training automatically means proper working habits.

### SHORT CUTS TO TONNAGE

THE COAL industry still is filling with creditable celerity all demands for its product, but the real pinch is yet to come. Then, even more than now, short cuts to increased tonnage per man and per machine will be at a premium. Many of the steps that can be taken to promote efficiency require, it is true, substantial investments and materials now hard to get. There are others, however, that take little money or materials and yet may result in material improvement in output.

Time spent actually loading is what counts in tonnage. Paradoxically, however, it is the time when loading is not going on that should be the object of constant check and scrutiny, whether loading is done by hand or machine. Here is where the real results can be attained in improving efficiency.

Excluding time involved in breakdowns and delays due to carelessness, poor maintenance, bad supply service, interference, failure to plan and the like, for which there is little excuse, non-loading time, where mobile machines are employed, usually is represented in moving and car or trip changing. Where conveyors are installed, car or trip changing, moving equipment and

face preparation normally constitute most of the non-loading time.

More coal per fall, concentration and proper car- or trip-changing methods will go far toward reducing non-loading time. Consequently, among the pertinent questions which might be asked are: (1) Are places being driven as wide as possible with safety? (2) Are places being cut as deep as possible? (3) Are the places for a mobile-loader territory as closely grouped as possible? (4) Are three, four or more conveyor places operated as a unit with one car-loading point? (5) Are changing points kept to within 100 or 150 ft. of the face in mobile loading? (6) Are proper trip-changing facilities provided where conveyors are used? Others could equally well be added to the list, with the objective always an increase in actual loading time.

### SCRAP FOR VICTORY

WITH furnaces using material at an unprecedented rate (an output of 90,000,000 tons of steel is forecast for 1943), and with half of this output necessarily consisting of scrap, there is little opportunity, regardless of past efforts, to sit back and say one has done one's share. In fact, more pressure is needed now than ever before, not only in getting iron and steel to the furnaces but also in salvaging and returning to war use all other strategic metals and materials, including rubber.

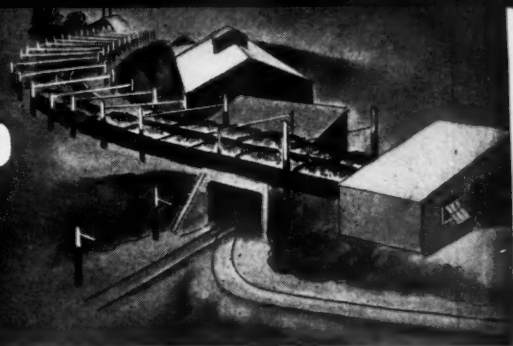
Both true scrap and "dormant" scrap are wanted by the War Production Board and the American Industries' Salvage Committee. Speaking of dormant scrap, the WPB says: "If it hasn't been used for the last three months and no one can prove it can be used in the next three, find a use for it or scrap it." Finding a use for it, of course, includes selling it to some other man who can apply it in his work.

To achieve the goal of getting out the most scrap, both true and dormant, in the shortest possible time, WPB recommends appointing an executive as salvage director and establishing a practical, continuing campaign of recovering and moving scrap. WPB field men stand ready to assist at any time. The campaign adopted at any particular plant, of course, will be fitted to the conditions at that operation, but it should be based on enlisting the cooperation of employees. In eastern Kentucky, as an example, District 30 miners and operators arranged to work jointly, with the miners donating Saturday time and the operators current, mine cars and locomotives for transportation, plus railroad cars for shipping the material.

But while the methods may vary, the objective is the same: the earliest possible starting of critically needed waste materials to the plants making implements of war. When a furnace is forced to shut down, victory is set back just that much. A river of scrap is a guarantee of an earlier achievement of our goal.



# COAL AGE NEWS ROUNDUP



## Miners Approve Longer Working Schedule, Ask Higher Wages, in 37th Convention

**Break with CIO Completed at UMW Convention—Constitution Altered to Permit Unlimited Organizing, Including Mine Bosses—42-Hour Week Voted—Higher Wages Asked in Next Contracts**

APPROVAL of a six-day work week, increased wages in the next working agreements and a change in the constitution to permit an organizing drive among mine bosses and supervisors were among the outstanding steps taken at the 37th constitutional convention of the United Mine Workers of America, which got under way at Cincinnati, Ohio, Oct. 6.

One of the first acts of the convention was to vote the United Mine Workers out of the CIO. This was followed by amending the constitution to permit organizing anywhere desired. With the new language in italics, the membership provisions now read: "to unite in one organization, regardless of creed, color or nationality, all workers eligible for membership employed in and around coal mines, coal washeries, coal processing plants and coke ovens and in any other industries as may be designated and approved by the international executive board, on the American continent." In another move presaged by the activities of the Mine Officials' Union of America (October Coal Age, p. 63) the eligibility requirements were changed to permit organization of an estimated 50,000 "mine bosses and supervisors."

Before getting down to the subject of hours and wages, the convention approved all-out aid to the allies of the United States in the present war, approved the previous removal of Philip Murray as international vice-president, protested against the administration of the Bituminous Coal Act because the union had been given no part in it, opposed the proposed St. Lawrence Seaway, approved a resolution order-

ing wildcat anthracite strikers back to their jobs, ordered an investigation into the affairs of Districts 2 and 5, advocated reduction of the age limit for receiving compensation under the Social Security Act, rejected pleas of proponents for increased district autonomy and, among other things, approved a hike in the monthly dues of 50c. to build a war chest and see the union through "post-war" difficulties.

### UNION APPROVES 6-DAY WEEK

Asking government cooperation in transportation, coal prices and priorities on mining equipment and supplies, the convention on Oct. 14 approved a resolution permitting the working of a 42-hour six-day week for the remainder of the present contract period. With the longer week, however, the convention voted for time-and-a-half for all work over 35 hours and double time for Sundays and holidays.

With the adoption of the recommendation, John L. Lewis wired Fuel Coordinator Ickes promising to work out details with the operators and calling attention to: (1) "The necessity of steps to prevent some millions of tons of special-use coal being transported great distances and used for energy producing purposes, thus closing down mines in the steam-coal area"; (2) "necessity of the coal industry being given maximum sales prices high enough to permit operators to pay time-and-a-half and rate-and-a-half for the sixth day, as in other industries"; and (3) "the necessity for the industry being given priority orders on mechanical supplies and equipment to prevent the lessening of

production and the reduction of output per man now on a vast scale throughout the industry."

Despite the offering of resolutions proposing that the union press for wage increases of from 15 to 50 percent, with many asking for \$2 per day, the convention did not vote a request for a specific wage increase when the present contract expires. Instead, it recommended negotiating the "best basic contract obtainable through the medium of a national, Appalachian, southern wage conference or other proper joint wage-scale conferences," with anthracite proposals to be considered by a tri-district convention shortly before the contract expires. Other recommendations included abolition of all "discriminatory differentials between districts" and adjustment of "inequalities in rates of pay now existing between certain day-wage classifications," particularly in mechanical mining. Preference was expressed for a national bituminous wage conference, if possible.

### Maximum Loading Order Revised: Truck Certificates Required

A revised order requiring maximum loading of railroad cars carrying civilian freight was put into effect by the Office of Defense Transportation Nov. 1. With certain exceptions, it prohibits railroads from accepting for shipment any freight cars not loaded to full visible or marked weight capacity. Tank, freight and l.c.l. cars are excluded, and provisions were made for granting exceptions in unusual or hardship cases.

Other actions to speed coal movement and turnaround of coal cars included a reduction of free time for holding cars loaded with coal or coal products at Atlantic ports for transshipment or storage. To ease the pressure on coal movement to eastern gateways, certain railroads, at the request of ODT, opened new western routes to handle part of the traffic

from the coal fields of West Virginia and eastern Kentucky to New England destinations. Rates over the new routes were generally equalized with those over the previous shortest routes. Also, the Virginian Ry. extended from Oct. 10 to Dec. 31 its rate of \$4.14 per gross ton on coal from West Virginia to the Edgewater and Hoboken piers for transshipment to New England. A rate of \$4.09 to the South Amboy piers also was extended to the Elizabethport, Perth Amboy and Port Reading piers.

ODT in October also issued in-

struction booklets for the guidance of operators of commercial trucks in applying for the Certificates of War Necessity now necessary under General Order ODT No. 21. These certificates must be obtained by Nov. 15. The instruction booklets cover applications for operators with one or two, and more than two vehicles (fleet operators). ODT also issued a regulation which will permit truckers to operate the full mileage provided by their certificates in spite of curtailments provided in General Orders ODT Nos. 6 and 17.

## **Manpower Problem Grows More Critical; Mines Continue Victory Drives**

WITH the government moving further forward on the road to control of wage rates and allocation of manpower, coal continued its efforts to arrive at a solution of its own manpower problems in October. The month was marked by strikes in both the anthracite and bituminous regions, despite the organization of still more "Victory Production Committees."

Stabilization of the cost of living was the object of legislation for the control of prices, wages and salaries passed by Congress Oct. 2. The President immediately issued an executive order putting the law into effect, one of the sections of this order forbidding any wage increases above the level of Sept. 15 and any decreases below the highest wage paid between Jan. 1 and Sept. 15 unless approved by the War Labor Board. Approval will be given only when necessary to "to correct maladjustments or inequalities, to eliminate substandards of living, to correct gross inequalities or to aid in the effective prosecution of the war." The WLB's jurisdiction was extended to "all industries and all employees" instead of only those involved in a labor dispute.

The need for legislation providing a more effective means of directing manpower to jobs was pointed out by, among others, Donald M. Nelson, WPB chairman, and Paul V. McNutt, War Manpower Commissioner, in Congressional hearings in October. A bill for allocating labor supply with administration approval will be submitted soon, McNutt stated. Meanwhile, the War and Navy departments announced a joint policy of refusal to accept enlistments by key men in federal agencies or in war industries without a written release from the head of the agency or company con-

cerned. Coal mining was included in the essential industries list.

Gold mining was halted under a WPB order Oct. 8 to release men for the production of copper and other metals, and late in the month reports were current that plans were under way to obtain the furlough of skilled men from the Army to work in copper and other strategic metal mines. Copper producers, in particular, were asked by WPB to furnish a complete list of mine workers who have enlisted or been drafted.

Pressure for production at coal mines continued in October, with much of the work concentrated in the anthracite region, also the scene of most of the strikes in October. Rallies in which Army contingents participated were held in the principal anthracite centers late in September and early in October as a means of spurring production, reducing absenteeism and generally improving productive efficiency. In the southern region, plans were laid for awarding collieries with low absenteeism records an anthracite "A" flag under the sponsorship of the victory production committees. The industry prepared also to go on a six-day week when necessary under the terms of the present wage agreement, which provides working 12 Saturdays between Nov. 1 and April 1. Consequently, it was held that there would be no necessity for negotiating a special agreement, as in the bituminous regions (see report on United Mine Workers' convention elsewhere in this section).

Miners at the No. 6 operation of the Susquehanna Collieries Co., Glen Lyon, Pa., struck Oct. 1 in a dispute over alleged rate changes and other matters, and this dispute was scarcely settled when employees at the No. 7

operation, Nanticoke, walked out Oct. 7 in what union officials termed a "wildcat" strike. The Henry and Prospect collieries of the Lehigh Valley Coal Co., Wilkes-Barre, were closed Oct. 13 as a result of a controversy over the assignment of a motor-man to another section of the mine. The walkout ended Oct. 17 with an agreement to discuss grievances.

The major anthracite stoppage in October, however, was at the Panther Creek Valley operations of the Lehigh Navigation Coal Co. and the Edison Anthracite Co., beginning Oct. 7. The strike was condemned by the UMW convention Oct. 8, and on Oct. 13 John L. Lewis appointed a commission to investigate and adjust matters in the region.

Organization of labor-management victory production committees continued in the bituminous regions of the country, while a number of union officials declared against "discriminatory" deferments of workers. Early in October it was announced that victory production committees had been established at 82 mines in central Pennsylvania, with nine more in southwestern Pennsylvania, Alabama and Illinois. In central Pennsylvania, a central committee was set up to coordinate the work. Members are: James Mark and Edward Sweeney, United Mine Workers, and Walter A. Jones and Charles O'Neill, Central Pennsylvania Coal Producers' Association.

A few strikes took place at bituminous properties in October. Three eastern Ohio mines (Nos. 3 and 4, Rail & River, and Glen Robbins, Youghiogheny & Ohio) were closed Oct. 12 in a dispute over an umpire's ruling on adjusting wage rates paid for timbering. National Labor Relations Board rulings affecting coal mines handed down in October included one directing the Windsor Coal Co., Windsor, Mo., to cease interfering with organizing activities or discriminating against employees for such activities. Later, the board absolved the Fentress Coal & Coke Co., Fentress, Tenn., of similar charges.

### **Higher Rates and Freight Tax Included in New Tax Law**

Higher rates all around and a tax of 4c. a ton on coal freight were features of the federal revenue act signed by the President Oct. 21. The act is estimated by the Treasury to raise \$8,654,000,000 in new money, of which \$1,682,200,000 will be returned



in the future. Congressional estimates are a gross of \$9,600,000,000, of which \$1,700,000,000 will be credited against other taxes or returned after the war. The Treasury has asked for new \$6,000,000,000 legislation, but reports were that it probably would not be considered until after the first of the year.

The normal tax on personal incomes is increased from 4 to 6 percent, with the surtax on the first \$2,000 of income increased from 6 percent to 13 percent, graduating to 82 percent instead of 77 percent on all income over \$200,000. Present personal exemptions of \$1,500 for married persons, \$750 for single persons and \$400 for dependents are reduced to \$1,200, \$500 and \$350, except for men in the armed services.

In addition, a victory tax of 5 percent on all incomes over \$624 a year goes into effect Jan. 1, 1943. Except for agricultural and domestic workers, this tax will be collected by deductions from pay envelopes. Those who pay such a tax (all earning over \$12 per week) are entitled to a credit of 25 percent if single, 40 percent if married, with 2 percent additional for each dependent. This credit may be taken against federal taxes paid, beginning March 15, 1944, or converted into non-interest-bearing bonds to be repaid after the war.

#### OLD-AGE TAX CONTINUED

The present old-age benefit tax of 1 percent on the employee and 1 percent on the employer is continued for 1943.

In the field of corporate taxes, the new act includes the following: normal tax—present rates, ranging from 15 percent on the first \$5,000 to 19 percent on the last \$5,000, are retained for corporations earning up to \$25,000 annually along with the present flat rate of 24 percent for earnings over that sum; surtax—present rates of 6 percent below \$25,000 and 7 percent above are raised to 10 and 16 percent; excess profits tax—present exemption of \$5,000 for all companies is retained. Present rates, ranging from 35 to 60 percent, are replaced by a flat 90 percent; post-war credit—corporations will receive a credit equalling 10 percent of excess profits taxes, to be repaid after the war; over-all limit—no corporation may be deprived of more than 80 percent of its net income in all taxes.

The percentage depletion provisions, under which the requirement of a binding election is eliminated

and permitting mining companies to take either percentage or cost depletion in any year, a two-year "carry-back" for both net operating losses and unused excess profits credits, and restoration of the capital stock and declared-value excess profits tax, with provision for an annual declaration of value, were among the other features of the new act.

The list of excise taxes included an impost of 3 percent on freight shipments, except coal, on which the rate is 4c. per net ton.

#### Materials Further Restricted: Higher Rating Given Mines

With materials getting tighter and still further restrictions going into effect in October, mines were given a still better priority status for certain equipment and supplies. Lumber, for example, was scarcer, while many metals and other critical materials continued in short or shorter supply. Consequently, the trend toward allocation and quotas instead of priorities gained visibly in October.

To better handle the pressing problems of getting materials to the users which need them most, several changes were made in War Production Board operations, including organization of a priorities control bureau expected to speed action materially on applications. Regulations Nos. 3, 11 and 13 were amended to, among other things, ease extension of preference ratings, rerating and the like.

#### MINING REMAINS ESSENTIAL

Evidence that the mining industry will continue on the list of essential industries was afforded by an amendment to Order P-56 granting a rating of AA-2X for deliveries of materials for maintenance and repair within the limits of quotas assigned individual operators by WPB. The rating for delivery of operating supplies was raised from A-1-c to A-1-a.

Conveyor and transmission machinery was the subject of Limitation Order No. L-193, issued by WPB in October. The new order sets up machinery for scheduling production and requires filing monthly schedules. Orders of \$5,000 or more must be specifically approved by the WPB Director General of Operations; likewise engineering services. The restrictions on materials which may be used extend to bins, bunkers, hoppers and tanks when used as a part of conveying machinery or equipment, supporting



structures, galleries, housings, walkways, guards, drives, bearings and other auxiliaries or accessories. Underground mining conveyors (except slope installations) are included in the scope of the order.

Manufacturers of off-the-highway motor vehicles were authorized to treat orders for such vehicles as if they bore AA-2X ratings in Amendment No. 2 to Supplementary General Limitation Order L-1-e. The original authorized manufacture of 500 of these vehicles in the last six months of 1942, with letters of authorization covering some 200 to date.

Production of heavy forged hand tools, including bars, blacksmiths' tools, mauls and hammers or sledges over 4 lb., hoes over 3½ lb., mattocks, picks, railway track tools, tongs, wedges, blasting tools for mines, breast drills and miscellaneous forged hand tools were limited in a new schedule issued Oct. 3 under Order No. L-157. Purchasers and suppliers of welding rods were warned that, despite the provisions of Order L-146, making provisions for delivery of electrodes for maintenance and repair, the copper order, M-9-a, still applies to bronze rod and a rating of A-1-k or higher is required for delivery.

#### RUBBER SHOES RATIONED

Rationing of rubber boots and rubber work shoes to those holding jobs essential to the war effort or to the protection of public health and safety began Oct. 5 with the lifting of an OPA freezing order. Sales now may be made only upon presentation of rationing certificates. Application of ceiling prices to the sales of electric storage batteries were postponed by OPA from Oct. 1 to 15.



## Oil Rationing Under Way in 30 States; Conversion and Coal Use Pushed

RATIONING of fuel oil in 30 states and the District of Columbia (October Coal Age, p. 61) got actively under way in October, although pressure for conversion did not cease. In fact, while stating that the average cut in oil consumption would be one-third, government officials reiterated their threat that those who could convert to coal and failed to do so would be cut off oil entirely. Other fuels also were further limited or rationed while pressure to make coal available was increased.

Under the oil-rationing plan, the heating season is divided into five periods, with rationing coupons, numbered one to five, issued only for those periods. Oil purchased before or on hand is considered part of the consumer's ration, regardless of the date on which the coupons actually are available. Rationing will be adjusted, it was stated, to actual living needs, and will be predicated on the consumer's answers to application questions, plus investigation of the premises, if necessary. Diesel oil and kerosene are included in the rationed products.

### TANK-CAR MOVEMENT DROPS

Efforts to promote oil movement to the East, the most critical area, were continued in October, but, despite the pressure, tank-car movement fell off. The Midwest also was warned that unless conversion was speeded the supply of oil for that area "will not be adequate." Pooling of petroleum supplies and terminal facilities in the East was ordered Sept. 29 as another move in the attempt to speed oil deliveries by tank cars. Great progress was reported in the construction of the new oil line from Texas to Norris City, Ill., with an average of six miles a day early in October.

While increased stress was placed on facilitating coal movement and conversion, certain other fuels were encountering bans for domestic use. Petroleum coke for domestic consumption was ruled out by a limitation order in October.

Among the steps taken to promote coal movement were numerous price revisions by the OPA and other help in the form of freight assistance and the like. Anthracite dealers on the Atlantic Coast north of and including Portsmouth, N. H., and east of Stonington, Conn., and wholly dependent

upon water transportation, were made eligible to file for government absorption of higher transportation costs. All solid-fuels dealers who have sustained increases in costs on individual kinds and sizes of coal were allowed, within certain limitations, to pass on the increased cost under the terms of an amendment to M.P.R. No. 122.

Temporary maximum prices applicable to the transportation of bituminous coal by barge from Hampton Roads to New York and New England, established Aug. 1, were continued to Dec. 2 by OPA. Originally scheduled to expire Oct. 2, the rates were continued while the I.C.C. decides whether the companies engaged in this trade are common carriers, in which case they are not subject to OPA regulation of their rates. Consequently, instead of establishing permanent rates, the temporary schedules were continued.

In the commercial and industrial fields, OPA permitted operators, under certain conditions, to crush double-screened lump and mine-run and sell the resultant at maximum prices for mine-run, this to add to the supplies necessary for war-plant operation. Also, the Division of Solid Fuels Utilization for War of the U. S. Bureau of Mines announced a consulting service

on the prevention of spontaneous combustion in storage for commercial users of coal.

On the equipment front, sales of Class B stokers by dealers were forbidden, with certain exceptions, without government authority or proper priorities, unless for converting an oil installation, in which case no permission is required. OPA also helped things along by setting maximum prices on grates, ash-pit doors and other parts necessary in converting boilers from oil to coal, as well as on installation costs.

### Price Revisions Affirmed By Interior Secretary Ickes

Closing proceedings in General Docket No. 21 as far as general revision of minimum bituminous coal prices are concerned, Secretary of the Interior Ickes, in an order and opinion dated Sept. 30, affirmed the Aug. 28 order of the acting director establishing new prices. Mr. Ickes reviewed three questions, denying a review of others. The three were:

"I. The question whether the Division had the statutory authority to include in the revised minimum prices set forth in this proceeding an amount sufficient to insure a return per net ton for the Minimum Price Areas which approximates the weighted average of the cost per net ton of the Price Areas.

"II. The question whether, in revising minimum prices, the acting director properly adopted the so-called weighted average adjustment method and properly rejected the so-called automatic adjustment method.

"III. The question whether minimum prices for coal produced in Price Area 2 were properly ordered changed in these proceedings." In this area, the change in cost was less than 2c. per ton.

Affirming the action of the acting director in these questions, Secretary Ickes stated that "it is therefore unnecessary for me to consider such applications for a stay of the effective date of the acting director's order as were presented to me."

An order of clarification was issued by Director Dan H. Wheeler Oct. 3 stating that price increases on coal shipped by the Great Lakes would be the increases for the market areas physically contiguous to the unloading docks, and for river, ex-river and tide-water for the market areas which are the ultimate destinations of the coal so shipped.



A section of the new Texas-Illinois oil line, designed to increase oil movement to the East. The line is to be extended to the Atlantic seaboard (see p. 118).

# HOW PRIORITIES WORK

## To Help Coal Mines Sustain Production

Priorities a Method of Insuring Proper Flow of Materials Into Essential Uses—What Coal Operators Should Ask Themselves Before Requesting Assistance—Procedure in the Mining Branch—Future in Materials

By **D. L. McELROY**

Chief, Coal Section, Mining Branch  
War Production Board

THE COAL industry to date has done an excellent job of providing coal for our war effort. Our main problem is successful continuation of that job until the Axis powers are crushed. If we are to achieve that goal we must have the minimum manpower and materials required to do the job. Along with the request for adequate manpower and materials goes the obligation and necessity of utilizing to the maximum what is available to the industry. With the great demand of the armed forces for manpower and materials we must make the ultimate use of all of our facilities.

The Coal Section of the Mining Branch of the War Production Board has the responsibility of making sure that coal mining obtains the needed supplies, materials and equipment necessary to produce the coal required for our war effort—but no more than it needs.

The cooperation of the industry has been excellent. This cooperation has greatly influenced the results obtained and the status of coal at the moment is the answer to the question as to what the results have been. We all hope that future results will be comparable. With our war plans culminating in victory the results must be comparable. Production by "the Arsenal of Democracy" depends too much on coal for it to be otherwise.

All of us now are well aware that industry cannot get everything in the time desired or in the quantity or quality desired. Coal mining is no exception. Many things are not done and many materials are not used that in normal times, at many mines, are considered good practice. Many such changes are inconvenient and some increase costs, but unless it can be

shown that they adversely affect needed coal production they must be made. In nearly every case involving such changes, an explanation to the applicant has brought a response which leaves no doubt as to the patriotism of coal-mining men.

A company holding a serial number under Order P-56 can initiate an application for new equipment by sending the information outlined in the following paragraphs to the Coal Section of the Mining Branch. This



The author, D. L. McElroy

information can be set forth in a letter or entered on any one of several forms prepared by various coal associations and some coal companies. Mines which do not hold serial numbers under Order P-56 should apply for preference ratings on orders for new equipment on PD-1A application forms secured from the Mining Branch or any WPB field office.

Predicated on the fact that we are not operating on a "business as usual" basis—and we certainly are not—coal operators should ask themselves the

following questions before requesting priority assistance for equipment or materials:

1. Is it absolutely essential to proper operation of the mine?
2. Are present facilities being utilized to the maximum?
3. Have I exhausted my engineering ability and ingenuity in providing a substitute or other methods that will eliminate the need for new facilities?
4. Is a substitute or second-hand equipment available?
5. Do I have sufficient labor to use the requested materials or equipment to the maximum?
6. Am I scheduling my request as nearly as possible to give delivery when needed on the ratings generally available for such materials?

In requesting priority assistance on new equipment, proper answers to the above questions should be a part of the application. The most important information is a clear, concise explanation why the equipment or material is essential to production. If necessary to make the explanation clear, maps or sketches should be included. The experience of the Mining Branch indicates that this part of the application should be prepared by the engineering or operating departments.

The following routine information also should be a part of the application.

1. Name and address of the applicant company and the serial number (or numbers) under P-56 for the mines involved.
2. Daily tonnage of the mine or mines, number of men employed, shifts worked the preceding month and shifts worked per day.
3. List of items required, with specifications, value and your order number.
4. Name and address of supplier.
5. Lowest priority rating required for delivery needed.

6. Percent of production going to industrial and defense customers with list of customers taking bulk of production.

7. Any other pertinent information, including possible second choice in items.

Ordinarily, the above information will enable the man handling the case to recommend, or not, a rating on the order for the material. When special or unusual cases require additional information the analyst will request it. There are, of course, numerous consultations on special or particular cases. In some instances, field investigations are made by the field staff or Washington staff. All men in the Coal Section are experienced in coal mining.

#### CAREFUL ANALYSES MADE

If a recommendation for the requested rating cannot be made, based on the facts of the case and the scarcity of the material, the applicant is so notified. If a recommendation is made, a letter or telegram of authority, as well as a report explaining the reasons, are prepared by the analyst. After the branch chief's signature of approval is attached, the case is forwarded to the proper reviewing authority and, if approved, the letter or telegram is sent to the Issuance Office, where the proper signature is affixed and the authorized rating is sent to the applicant. The letter or telegram is the authority to use the specified rating in accordance with the procedure outlined in it. A copy is mailed to the specified supplier. The Coal Section has always operated on the principle of carefully analyzing each case and making recommendations only when full justification could be substantiated. As a result, very, very few Coal Section recommendations have been returned and most of these subsequently were approved.

All project applications for opening new coal mines or reopening closed mines are cleared through the Coal Section of the Mining Branch. To initiate such an application, the applicant should first communicate with the Mining Branch, outlining the proposed project. The Branch then will prescribe the proper procedure.

Any application for which no recommendation is made can be reopened in the regular procedure at any time by presentation of additional facts. In cases where no priority rating is secured the applicant should so notify his supplier. All applications,

whether new or revised, are handled, and a decision reached, entirely on their individual merits. Each application is reviewed on the basis of the need for the requested material in the production of coal essential to the war effort. Needs which arise from breakdowns are so recognized and are handled as emergencies in preference to regular applications. In any cases involving breakdowns of equipment the applicant should communicate directly by telegraph or telephone with the Coal Section, Mining Branch, 1404 Temporary Building R, Washington, D. C. The telephone number is Republic 7500, Extensions 3335, 4615 and 2051.

Quota certificates under P-56 and PD-25A certificates under the Production Requirements Plan are both relatively new to coal-mine operators. The quota certificates and PD-25A forms are mailed to each coal company under Order P-56 usually 15 to 30 days before they are due to be filed with WPB. Instructions as to procedure always are included in covering letters or on the forms themselves. If at any time these two forms are not received 15 days before the beginning of a quarter, the Mining Branch should be notified of the fact. Of course, mines which do not use \$5,000 or more of raw materials as outlined on Schedules E and F of PD-25A will not receive that form. All mines under Order P-56 should receive the quota forms. Copies can be secured from the Mining Branch or any field office of WPB.

#### QUOTA CERTIFICATES HELP

The quota certificates under P-56 have been in use since the second quarter of 1942 for repair parts, and the PD-25A applications were first filed by coal mines for the fourth quarter of 1942, the latter by all mines using over \$5,000 of the raw materials shown on the PD-25A form. Although both these procedures may seem burdensome, they are necessary for proper control of raw materials and repair parts and an equitable distribution of a proper share of the total available to the coal industry and, in turn, to the individual mines. It would surprise many coal operators how many times data submitted on quota and PD-25A applications have been used to justify material needs of the coal industry.

Mines which did not qualify to file Form PD-25A on the basis of using \$5,000 of raw materials (approximately 50 percent of the national coal tonnage) continue at present to get all

materials and repair parts by quota certificates or by individual ratings from the Mining Branch. The future probably will reveal a further shift to some procedure based on the Production Requirements Plan.

In filing both quota and PD-25A applications, operators should keep in mind the following points shown by the experience of the Mining Branch to be important: (1) Read instructions fully, follow carefully and enter all information requested; (2) keep requests to the minimum for proper mine operation; (3) explain fully any unusual requests as to quantities of material (examples: unusual repair jobs; requesting rail or pipe when total inventory indicates an ample supply but particular sizes are required; or moving substation equipment requiring unusual quantities of wire).

If an emergency arises during a quarter, the company should file a PD-25F form, if a PD-25A application had been filed, giving a complete explanation. If the emergency requires quota items, a request with a full explanation should be made to the Mining Branch for a supplementary quota. Be sure the explanation tells what, when and why.

#### FACTS FOR QUOTAS

All quota and PD-25A applications are analyzed and certificates issued on the basis of the following facts:

1. Quantity of material available.
2. Needs of the mine based on:
  - (a) tonnage produced; (b) type of mining, as conveyor, mobile or hand loaded, strip mined and method of mining; (c) other data in the Mining Branch files on the company operations; (d) type of coal and markets.

In the future there is little doubt that more complete inventory data will be required, particularly on raw materials and quota items. Such data are essential for equitable distribution of these materials and coal operators should keep this fact in mind in preparing data for future applications.

The Coal Section of the Mining Branch, as stated, has done and will continue to do all it can to provide the necessary materials—but no more—required to produce all the coal essential to winning the war. It is the belief of the Mining Branch that continued operation of all present mines is essential to the war program. The Mining Branch is organized to serve the priority needs of the coal industry and it will do its best to give that service at all times. But: "If it won't help win the war, forget it."





The new Isabella man-trip cars have a steel top, fully inclosed trolley wire side and ends and comfortable seating arrangements for 38 men each.

# SAFETY AND COMFORT

## Feature Special Isabella Man-Trip Cars

Usual Mine Car Affords Little Protection in Moving Men—Cost of Good Cars Will Be Returned if Only One Life Is Saved—Armored Top, Side and Ends, With Good Seats, Feature New Isabella Units

**By S. M. CASSIDY**  
Manager, Weirton Coal Co.  
Isabella, Pa.

A DREAM of ten years was finally realized a few months ago by the installation of special man-trip cars with unusual safety features at the Isabella mine of the Weirton Coal Co., Isabella, Pa. The Weirton Coal Co., a subsidiary of the National Steel Corp., produces metallurgical coal and coke for the Weirton Steel Co.

Prior to installation of the new cars the men were transported in old wood mine cars, retained for that purpose when 8-wheeled 10-ton steel cars were purchased in 1937 (Coal Age, July, 1938). One end was taken out of the old cars and a flat seat was built on one side to make it possible for a maximum of six men to ride in each car. Nobody was allowed to ride on the other side because of the trolley wire. One trip was composed of the "jumbo" coal cars, which could hold about 24 men each, although only 12 were allowed, for safety reasons.

Most coal mining men realize the many potential hazards involved in the transportation of men underground. This danger is most serious because of the large number of men concentrated in a small area. It can be lessened by strict observance of the State laws and company safety rules regulating the handling of man-trips, but the fact remained that six men were concentrated in each car with no protection against roof falls, trolley wire, knocked-out timbers, corrosive water and rock-dust hazard to eyes, and the tendency of the usual coal car to overturn or throw men out when derailed. All these and other dangers cannot be entirely overcome even by the strictest of regulations and the best of practice.

During July, in the bituminous mines of Pennsylvania alone, there were 14 men seriously injured in two man-trip accidents; some of these men are expected to die. Each year there are a number of fatalities from man-trip accidents, and what is true in Pennsylvania is true in other states. The U. S. Bureau of Mines has stressed the potential mass hazards

to man-trips in its safety program and has collected data on a number of such accidents.\*

Many coal mining men have personal knowledge of serious accidents to man-trips and others are familiar with near-accidents. One such occurred at the Isabella mine three years ago. Despite constant inspection, timbering and scaling, the roof fell on a passing man-trip, completely covering one car. Very fortunately, however, this car was a "flat-wheeler" and no men were in it.

About five years ago an active study was begun by the Weirton Coal Co. to design a practical and really safe car for hauling men. A search for previous installations disclosed none except for a few cars built specially for slope haulage and one case of an outside haul for weather protection only. These were of no help for regular mine haulage so a large number of designs were made and remade over a period of several years. After

\* "Falls of Coal and Rock on Man-Trips in Bituminous Coal Mines," C. W. Owings, Information Circular 6863, U. S. Bureau of Mines.



Running-gear design, including spring suspension, permits the new cars to take 25-ft.-radius curves with ease and no more overhang than the old wood units



All set for a "Pullman-car" trip with complete comfort and protection

a satisfactory design was finally completed an order for eight cars was placed with the Differential Steel Car Co., Findlay, Ohio.

The new cars (see accompanying illustrations) have a coupling length of 25 ft., are 62 in. high over all above the rail and 75 in. wide. They can go around a 25-ft.-radius curve with the same overhang at the middle and ends as the 7-ft.-wide 16-ft.-long coal cars and seat a maximum of 38 men each. Four men can be accommodated comfortably in each of the eight seats, with three men at each end in the round vestibule.

Steel construction is used throughout except for the slats on the benches and a wood lining over the steel plate top. Both ends and the tight, or trolley wire, side are covered by steel plates. The two ends, the side and part of the floor are lined on the inside with insulating board to minimize any drummy noise.

Like the coal cars in use, the man-trip cars have Willison automatic couplers with spring and friction draft gear, 8-wheel Differential trucks,

spring truck mounting, and 10-in.-diameter Naco cast-steel wheels with Timken bearings. Each car has a holding brake on the four wheels at one end with a brake handle inside the car where the snapper rides. Other features include reflector buttons at each end, "highway yellow" painting inside and out for visibility, just the right space under each bench for dinner buckets, wood slat seats designed for comfortable riding, and sufficient leg and headroom.

As a maximum of protection was desired against roof falls the framework of the car is very strong with four 6-in. channels under the floor from end to end, while the posts and arched trusses between sets of seats are built up of 3-in. channels welded edge to edge to make a strong box. To this is added the girder effect of the solid plate on the tight side as well as the round tight ends. The arched steel roof plate is lined on the top side with  $\frac{3}{4}$ -in. tongued and grooved wood as a protection if the trolley wire is encountered.

Like Pullmans, each car has been

given a name—those selected have been battles in this war where American forces have fought, such as: Wake Island, Coral Sea, Bataan Peninsula, etc. Inside the cars are lettered slogans featuring safety, production and the war effort.

It is necessary to run three man-trips composed, respectively, of one, two and four cars each. One car is a spare. As the mine is triple-shifted the trips taking one crew in bring the other out. Each car averages a 6-mile round trip each shift, or 18 miles per day, or over 450 miles per month.

Needless to say, the men all like the "street cars." In comparison with coal cars the seats are very comfortable, clean, warm and dry. The men can forget the strain of watching the roof and timbers in transit. They are protected from roof falls, rock dust and water. They are shielded from the cold intake air in winter. There is practically no jerking of the cars and the ride is exceptionally smooth.

#### SAFETY PROMOTED

The motorman and snapper have a much shorter trip, with consequent ease and safety in handling. It is impossible for more than one man at a time to get out of each double row of seats. Any tendency to rise before the trip stops is prevented by the roof. The cars are so big and so constructed that if a derailment occurred the car would drop only a few inches and slide on the rails. Cars of this type are practically impossible to be overturned or jackknifed across the entry in a wreck.

Men cannot get out on the wire side. Neither is there any possibility of contact with trolley wire while moving in or out of the cars. Consequently the old practice of guarding wires, or shutting off power at man-trip stops, becomes superfluous.

Although the present car is 62 in. above the rail, which is satisfactory for Isabella main-line haulage height, this same design of car could be lowered a full 12 in. by dropping the floor deck, roof and seats, making a height of 50 or 52 inches over all. Modified designs have been figured out so cars could be made for still lower clearances.

Besides the advantages outlined, and looking at the purchase strictly as a money-saving proposition, these cars will pay for themselves if they only save the compensation cost of one life, or two or three serious injuries, during the years they are to be used.



# PILLARS RECOVERED

## With Crawler Loader and Shuttle Cars

Alpine Set-Up Provides 300 Tons per Shift From Pillars With 13-Man Crew—Equipment Comprises Mobile Loader and Shuttle Cars—Coal Thickness 7 Ft.; Pitch 8 Percent—Pillars Split and Slabbed

By IVAN A. GIVEN

Associate Editor, Coal Age

AN OUTPUT of 300 tons or more per shift from room, chain and barrier pillars with a force of 13 men per shift underground is the set-up at the Alpine mine of the Alpine Fuel Co., Baldwin, Gunnison County, Colorado. This performance, in 7 ft. of coal on an 8-percent pitch, is made possible by the use of crawler-mounted loading equipment served by shuttle cars.

Alpine mine was opened in 1888 and was taken over from the Rocky Mountain Fuel Co. in July, 1939, by L. D. Hardin, owner of the Alpine Fuel Co. His son, L. Douglas Hardin, is sales manager. J. J. Neish is superintendent; Fred Elkins, master mechanic, and Arthur M. Law, top boss. The mine output, sold under the "Baldwin Red Ash" trademark, comes from the Baldwin seam in the Mesa Verde formation. It is prepared in a shaker-screen tippie with supplementary crushing equipment for breaking down as much as 60 percent of the output, if desired, in making slack and stoker. Both the latter, as well as other sizes, may be dustproofed with Standard of Indiana No. 16 spray oil, using Viking equipment. Usual sizes shipped are 1½-in. slack or stoker, 1½x3-in. and 1½x6-in. nut and 3- and 6-in. lump. The mine is served by the narrow-gage system of the Denver & Rio Grande Western, and the coal moves into the

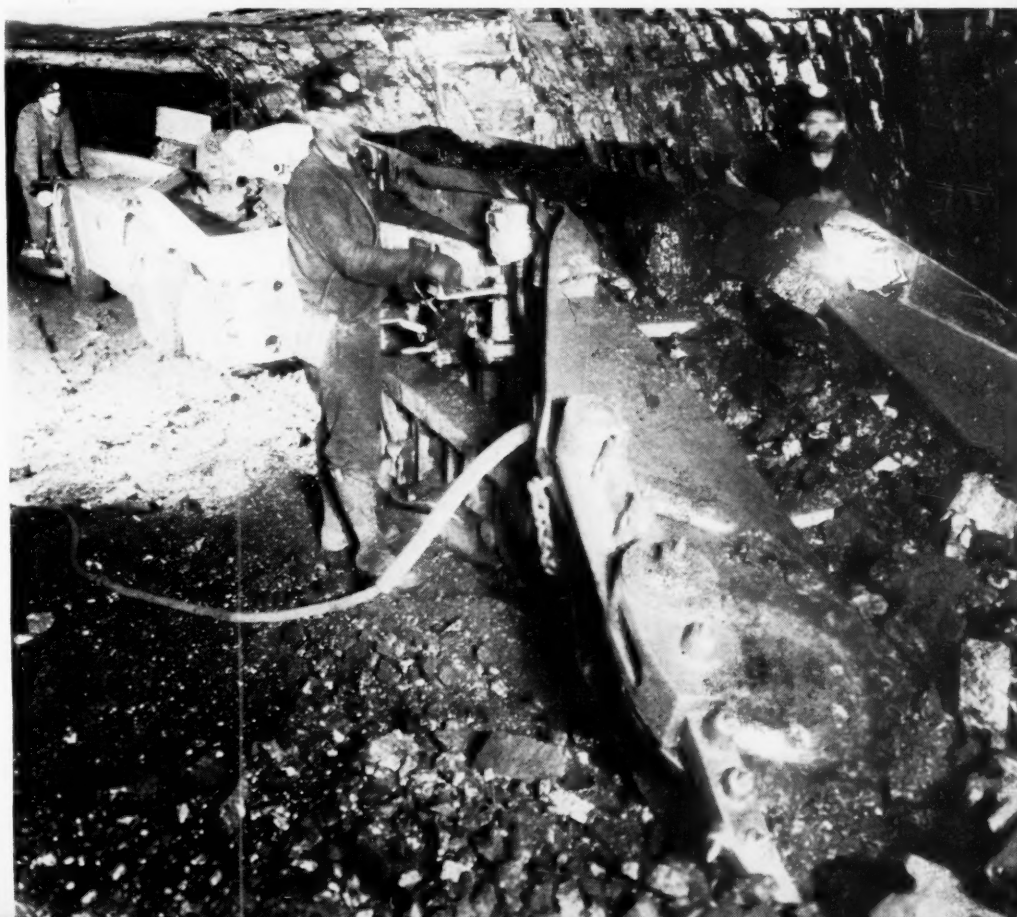
usual market areas served by Colorado mines: Colorado, Kansas, Nebraska, California, Iowa and Wyoming.

The main Alpine opening is a 125-ft.-deep shaft, with an auxiliary shaft at the back of the property to improve ventilation. From the hoisting shaft the mine was developed by slopes driven up the pitch on an average grade of about 8 percent. From the slopes, room entries were turned north and south, and were driven to provide rooms approximately 300 ft. long (worked up the pitch) with, usually, barriers against the entries above. The pillars normally were left in place and now constitute the major source of coal, although some virgin work is a possibility in the future.

The coal varies little from the usual thickness of 7 ft. or slightly over, and is clean from bottom to top. Underneath the seam is fireclay, which softens when damp. This condition has required corduroying and filling in a few instances to preserve shuttle-car roads. Over the coal is 4 to 5 ft. of slate, followed by 8 to 9 ft. of sandstone and then shales. The top is regarded as fair but requires regular timbering with both single posts and crossbars in most places. Pronounced face and butt cleats characterize the coal itself.

Hand work was continued by Alpine from July, 1939, to Oct. 1, 1941, when the present mining equipment was installed. From Oct. 1, 1941, to May 1,

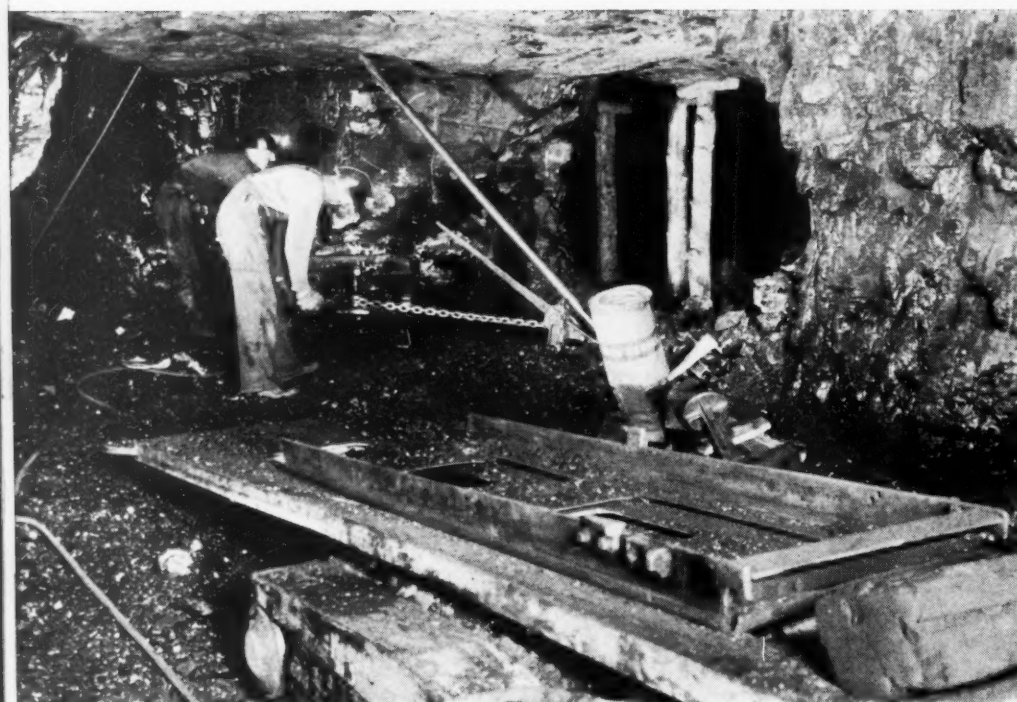
Loader and shuttle car at work in pillar.







Shuttle-car discharging to elevating conveyor.



Starting a cut in driving up through a pillar.

Drilling with hand-held unit.

Placing a carbon-dioxide tube in the face.



1942, the production was 40,000 tons, all from room, chain and barrier pillars. The production equipment comprises one Joy 11-BU loading machine, two 6-ton Joy shuttle cars powered by 300-amp.-hr. Gould "Kathanode Glasklad" batteries, one Electric Products charging set, one rubber-tired elevating conveyor, one crawler-mounted truck for transporting a Sullivan CE-7 cutter with 7½-ft. bar using standard forged bits and one Van Dorn hand-held drill with Hardsocg augers and bits.

Wooden mine cars with a capacity of 1 ton are used for moving coal from the loading station, or ramp, to the shaft. The total is 48, divided into four 12-car trips. The main hoist (see Fig. 1) pulls an empty trip up the slope and drops it into the parting shown. An auxiliary hoist at the ramp then drops in a loaded trip and picks up the empties, pulling them up above the ramp and afterward lowering them one by one for loading.

### 300 TONS PER SHIFT

The mine crew for a shift, aside from the superintendent-foreman, consists of a loader operator, two shuttle-car drivers, two cutters, one shotfirer-fireboss, one driller, two timbermen, one ramp- and hoistman, one main hoistman, one cager and one chief electrician. As stated, the operation is set up for an output of 300 tons or more per shift.

Progress of the work in the second territory to be mined with the new equipment up to the time this article was prepared is shown in Fig. 1. It includes extraction of both old room and chain pillars as well as splitting and pillaring of the barrier along the main slope. In accordance with accepted practice, all stumps are shot and loaded or at least shot, and timbers are pulled to make caves as soon

as a pillar or part of a pillar is worked out.

Because of the irregular size and shape of the pillars, the method of attack is subject to variations. Where possible, however, the method shown inset in Fig. 1 is employed. As indicated, a split or pocket is driven up the side opposite the gob, leaving a fender 3 or 4 ft. thick. If required, crossbars are set every cut. Then, starting at the upper end, protected by breakers, posts are set under the centers of the bars and the legs along the left rib are removed to permit cutting a slab 16 to 18 ft. long in the section toward the gob. Cutting and loading of such slabs is continued until the pillar is worked through. Then the timber is removed to promote a cave and relieve the weight, whereupon the equipment drops back to repeat the process.

#### FOUR HOLES DRILLED

The face cycle at Alpine follows the usual routine of timbering, cutting, bugdusting, drilling, breaking and loading. Cardox coal-breaking was adopted Sept. 1, 1941, in anticipation of mechanical mining and has resulted in a substantial increase in coarse-coal production. Small Cardox tubes are employed, with 120-gram heaters and No. 10 disks, and are loaded with 3 lb. of carbon dioxide. The usual solid-work place 14 to 16 ft. wide is broken with four holes placed about as shown in Fig. 2. The two center "busters" are designed to break down and roll out the center and thus relieve the two rib holes.

Power for the Alpine operation is made in the mine plant. Tubular boiler equipment is installed and is fired by Winkler stokers put in service in December, 1941. The fuel is slack, and the stokers have resulted in a 20-percent saving. Generating equipment consists of a 150-kw. 2,300-volt alternator, driven by a Chuse engine, supplemented by a standby 75-kw. d.c. generator, also steam-driven, along with the hoist and certain other loads. Underground is a 150-kw. Ridgway motor-generator set, providing nominally 275 volts d.c. It is set within 1,000 ft. of the face and receives 2,300 from the surface through a 3-wire system.

Fig. 2—Drilling pattern, carbon-dioxide coal breaking, normally employed at Alpine.

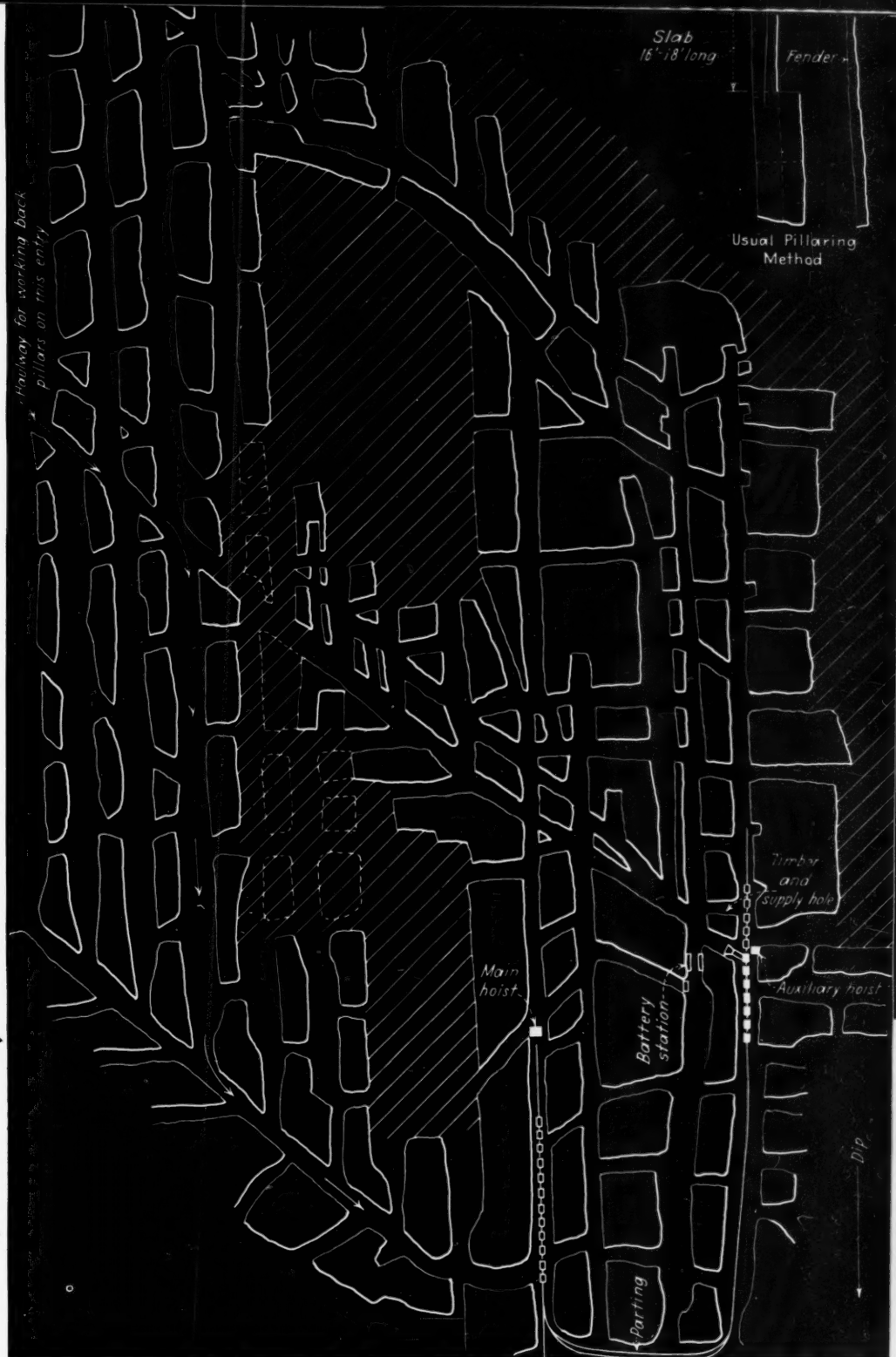
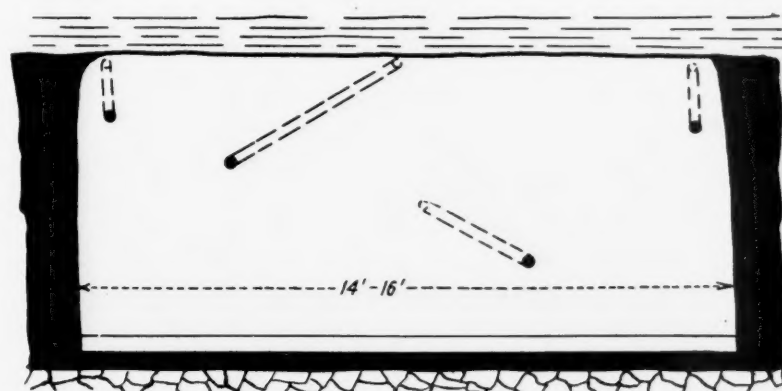


Fig. 1—Equipment set-up and progress in working out second old-pillar section at Alpine with loading machine and shuttle. Inset at top right is the usual pillaring plan.





# SHOVEL LEVELING

## Done Automatically by Electronic Units

Phototubes and Auxiliaries Level to Less Than One-Half Degree in 30 Seconds More or Less—Operation Is Automatic—Two Sets of Equipment Control Pairs of Jacks at Opposite Corners of the Machine

By **W. E. GILDERSLEEVE**

Engineering Department  
Marion Steam Shovel Co.

And **D. STOETZEL**

Industrial Engineering Department  
General Electric Co.

ELECTRONIC tubes and phototubes have developed with amazing rapidity in the last few years and the scope of their accomplishments is large. Devices have been improved and refined, so that they are particularly sturdy and suitable for use in even the most severe services. This has resulted in electronic devices finding a place even in the rough and exacting service en-

countered in open-pit mining operations. On first consideration, a phototube used in connection with a giant electric stripping shovel might seem to constitute an incompatible pair, yet in the automatic leveling system for large power shovels this combination is producing excellent results.

In view of the high output capacity of a coal-stripping shovel, it is of utmost importance that the percentage of digging time to total operating time be kept to a maximum. It is estimated that the additional digging time made available by automatic leveling will account for the removal of many hundreds of cubic yards of additional overburden each day.

A large power shovel operating in

open-pit coal-mining operations "moves up"—that is, changes its operating position—on an average of once every 45 to 60 minutes. It does not move far, and it moves very slowly. The surface of the coal strata upon which it travels is not 100 per cent level or clean, and the weight of the shovel is tremendous, running up to 1,500 tons or more, supported on four large caterpillar trucks, one at each corner of the machine.

During normal operation of a large stripping shovel, the lower frame of the machine upon which the upper structure revolves must be very close to level or the rotating motion will be severely handicapped, since it will have to work against gravity in one direction and with gravity in the opposite direction.

Therefore, all modern large stripping shovels are built with four hydraulic leveling jacks, one at each corner of the machine directly over the corresponding caterpillar trucks. These jacks are operated by oil under many hundreds of pounds pressure, supplied from a reservoir by motor-driven oil pumps. The function of these jacks is to level the machine after each move-up and to equalize the pressures on the four corners during the moving-up operation.

Before the automatic leveling system was devised, it was necessary to level the machine by hand, through the medium of oil pumps, valves, and piping underneath the shovel. This involved considerable loss of time, and depended on the personal characteristics of the operator for good results.

With the new automatic control, all that is necessary is for the operator to press a button in the cab, and the whole leveling operation is taken care of automatically. A signal light near the operator indicates when the operation has been completed and the machine is ready to work. Leveling of these giant machines is accom-

Automatic leveling equipment increases the efficiency of this 35-yd. shovel.





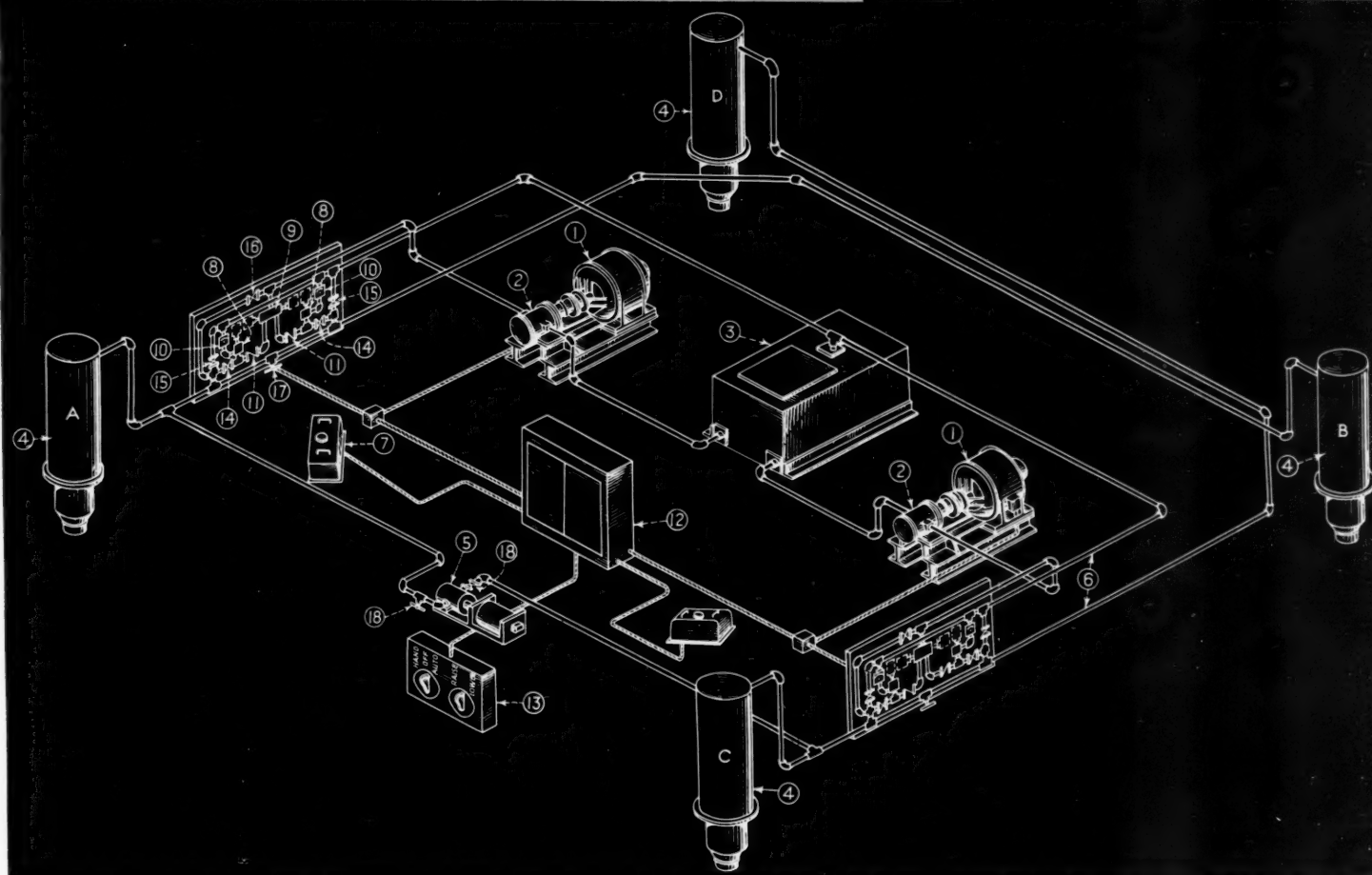


Fig. 1—Hydraulic System for Automatic Leveling.

1. Oil-pump motors.
2. Oil pumps.
3. Oil reservoir; capacity, 500 gal.
4. Jack cylinders, A, B, C, D.
5. Equalizer valve, solenoid-operated.
6. Hydraulic piping, scale-free seamless copper-bearing pipe.
7. Photoelectric leveling units.
8. Lowering valves, solenoid-operated.
9. Raising valves, solenoid-operated double valve.
10. Metering valves.
11. Check valves.

12. Electrical control cabinet.
  13. Operator's electrical control station for automatic leveling and raising or lowering entire machine.
- The following globe valves are provided for emergency operation and use when inspecting or repairing electric valves:
14. Normally open valve, close for isolating electric valves.
  15. Normally closed valve, open for lowering manually.
  16. Normally closed valve, open for raising manually.
  17. Normally closed valve, open for leveling manually.
  18. Normally open valve, close for isolating equalizer valve.

plished to an accuracy of something less than one-half degree and in 30 seconds more or less, depending on how much the machine is out of level.

The machine is leveled by two sets of equipment, each controlling the operation of a pair of jacks at diagonally opposite corners. Fig. 1 shows the arrangement and connection of the various pieces of equipment involved. Certain parts, such as the oil reservoir and the electric control cabinet, are common for the two assemblies.

The twin "hearts" of the equipment are the two photoelectric leveling units. These are conveniently located in two of four corner pockets on the machine. One unit is required for each set of diagonally opposite jacks.

The photoelectric leveling units control the "raising" and "lowering" valves. The required hand-operated valves are provided so that manual operation can be accomplished in case of an emergency.

The photoelectric leveling units are

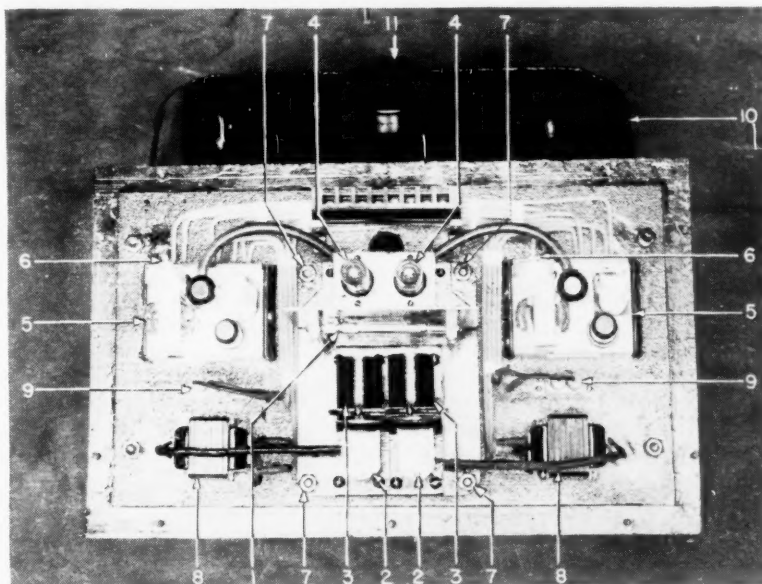


Fig. 2—Photoelectric Leveling Control Device.

1. Level vial.
2. Light source.
3. Condensing lens and holder.
4. Photoelectric tubes.
5. Amplifier units.
6. Sensitivity adjusting screw.
7. Sub-base leveling screws.
8. Light-source transformers.
9. Condensers.
10. Cover.
11. Inspection cover and handhole.

mounted on rubber, to minimize any vibration. Each leveling unit contains a pair of photo tubes, looking through a bubble level tube (level vial), and through condensing lenses to a pair of light sources. The light-source transformers, condensers, rheostats, amplifier units, etc., usually associated with photoelectric control are included, one set for each light source and electric eye. Fig. 2 shows the appearance of one of the photoelectric leveling units with the protective cover removed, and the table indicates the nature of the devices as numbered.

The bubble in the level vial is of such length that when the machine is level, and the bubble is centered in the vial, the light beams from both of the light sources are refracted away from the photo tubes. When the machine gets out of level and the bubble moves over, one or the other of the photo tubes sees the lights from the corresponding light source, and a train of operations is inaugurated which forces oil into one cylinder and bleeds a corresponding quantity from the diagonally opposite cylinder to again level the machine.

The level vials are designed with a special radius of curvature to provide accurate leveling. An interesting point is that, although a clear liquid is used, due to deflection of the light rays, the photo tube does not see the light source as long as the liquid is interposed. But when the bubble moves over, and is between the photo tube and the light source, the light is directed to the tube.

The electrical control system is such that when the high and low corners have been detected by the photoelectric system, the pumps are started, and the proper valves are opened for leveling the machine.

The cycle of operations, assuming jack "A" is higher than jack "B," is:

The bubble in the level vial of unit 7a (Fig. 1) will be off center, allowing light from the light source 2 (Fig. 2) to fall upon the photo tube. The photo tube current is amplified sufficiently to operate a relay in the amplifier 5 (Fig. 2) which operates the main control 12 (Fig. 1) to start pump 1 (Fig. 1), open valve 9 between pump 1 and jack "B" and open valve 8 between jack "A" and the

tank. The metering valves 10 allow oil to flow from jack A at the same rate of speed that the oil is being pumped in jack B.

As jack B is raised and jack A is lowered, the bubble in the level vial of the leveling unit approaches the center of travel. When the machine is level, the light is cut off from the photo tube, deenergizing the relay in amplifier 5 (Fig. 2), which stops the pump and shuts the valves.

A control station is arranged so that the ground attendant can raise or lower all four corners when desired. An equalizing valve coil is connected to the magnet valve switch for the propelling clutch, so that whenever the propelling clutch is engaged, the machine is equalized. This equalization of the loads on the four jacks during propelling is an additional and valuable feature.

Limit switches on each jack shut off the pump when the limit of travel has been reached in either direction, and a red warning light indicates when any one corner is too high or too low, and out of the range of the automatic adjustment.

## RIGHT FAN LOCATION Can Save Money and Help Ventilation

Efficient Fans Desirable but Right Location Is More So—Considering Air Losses and Pressures, Two Fans May Be Better Than One—New Openings and Fans With One-Way Air Travel Save Materially

By J. H. DICKERSON

Mining Engineer  
Huntington, W. Va.

EFFICIENT fans are desirable for good ventilation but the proper location may be an even more important factor in economy. This article will deal with some of the problems of fan location. Two or more fans, for example, may cost more than a single fan near the main drift but they also may provide better and more economical ventilation. Likewise, a new shaft or opening, with a change in fan location, may be very profitable.

The outline of a mine which could be ventilated entirely from a fan at Point A is shown in Fig. 1. The fan is 300 ft. from the main drift, B, as is sometimes necessary to avoid recirculating exhaust air and get the installation away from buildings, etc. It is assumed that 100,000 c.f.m. is required to ventilate the entire mine from this point. From pressure and volume readings of the air circulating it has been estimated that Section A-B-C-D will pass 100,000 c.f.m. without leakage at a 1-in. water gage; that the left split, C, will circulate 20,000 c.f.m. at a  $\frac{3}{4}$ -in. w.g.; that the right split, D, will require an average water

gage of  $1\frac{1}{4}$  in. to pass 30,000 c.f.m.; that the entries from D to E and return will pass 50,000 c.f.m. for the full distance with a pressure drop of  $\frac{1}{2}$  in. w.g.; and that the workings ahead of E will require 50,000 c.f.m. at that point with a water gage of  $1\frac{1}{2}$  in. These are the desired quantities of air for these splits. With these conditions, regulators will be required for the left split, C, and the right split, D, and the pressure for the fan at A will be 1 plus  $\frac{1}{2}$  plus  $1\frac{1}{2}$  in., or 3 in. w.g. for 100,000 c.f.m.

Problem No. 1—It is found that openings may be made at Points F and G (Fig. 1) at little expense and

therefore it is proposed that a fan be installed at G to ventilate the workings ahead of Point E. Using the data for the single fan at Point A but installing a second fan of equal efficiency at G, what will be the power saving?

The resistance necessary to deliver the air from F to the mains and back to the fan at G will be disregarded because in practice it will be more than offset by leakage in the mains between D and E with the fan at A. The quantity of air in Section A-B-C-D will be reduced one-half to 50,000 c.f.m. and therefore the pressure for that section will be  $\frac{1}{4}$  in. w.g. instead of 1 in. There will be an open split to the right of D with a resistance of  $1\frac{1}{4}$  in. w.g., so the fan at A will require an average water gage of  $1\frac{1}{2}$  in. for 50,000 c.f.m. Then, according to the assumptions, the fan at G would handle 50,000 c.f.m. at  $1\frac{1}{2}$  in. w.g. Thus the old and new conditions would be:

100,000 c.f.m. at a 3-in. w.g. for the fan at A ventilating the entire mine.

50,000 c.f.m. at a  $1\frac{1}{2}$ -in. w.g. for the fan at A ventilating mains right and left to D.

50,000 c.f.m. at a  $1\frac{1}{2}$ -in. w.g. for the fan at G ventilating the mine ahead of D.

100,000 c.f.m. at a  $1\frac{1}{2}$ -in. w.g. for two fans ventilating the entire mine.

#### TWO FANS HALVE POWER

Therefore, the total power for the two fans would be just half that used by the one fan at A ventilating the entire mine. If the management desired to use only the fan at A, but to employ openings F and G for airways, a similar analysis could be made to show a considerable power saving over the one fan at A and the single outlet at B.

**Problem No. 2**—A fan at Point A, Fig. 2, is delivering 150,000 c.f.m. at a 2.1-in. w.g. Three entries are used for intake and three for return airways between A and B. At B, leakage has reduced the air volume to 100,000 c.f.m., and the pressure between the intake and the return at that point is 0.5 in. w.g. It is desired to increase the quantity of air at B to 130,000 c.f.m. and the average pressure for future work ahead of B is to be 1.5 in. w.g. If the airways are not improved between A and B to reduce leakage and resistance, how much air will be required at the fan and what pressure?

Since it is desired to increase the air at B by 30 percent, it will be necessary to raise the flow at the fan at

least 30 percent, or 45,000 c.f.m. Disregarding new or larger leakage openings due to the increased pressure, the pressure at the fan will be raised from 2.1 to 3.55 in. w.g. (X in the equation  $150,000$  squared is to  $195,000$  squared as 2.1 in. is to X). However, the pressure drop for the intake and return air between A and B would be 2.7 in. w.g. (X in  $150,000$  squared is to  $195,000$  squared as 2.1 minus 0.5 in. is to X), so the new pressure reading at B will be 3.55 minus 2.7 or 0.85 in. w.g. Since it is assumed that an average of 1.5 in. of pressure will be required at B to circulate air through the future workings, the new pressure at the fan will be 2.7 plus 1.5, or 4.2 in. w.g.

This increased pressure ahead of B will mean more leakage between A and B and therefore it will be necessary to have more air at the fan to have 130,000 c.f.m. at B. With 65,000 c.f.m. leakage at an average pressure of 2.2 in. w.g. ( $3.55$  plus  $0.85$  multiplied by  $\frac{1}{2}$ ), there will be about 74,000 c.f.m. at 2.85 in. w.g. ( $4.2$  plus  $1.5$  multiplied by  $\frac{1}{2}$ ), but adding to the air at the fan to offset this leakage will result in higher pressure and further leakage, so we will assume that 10,000 c.f.m. additional air is required at the fan, or a total of 205,000 c.f.m. Therefore,  $195,000$  c.f.m. squared is to  $205,000$  c.f.m. squared as 2.7 is to 3.0 in., and the air required with the fan at A will be 205,000 c.f.m. at a 4.5-in. w.g. ( $3.0$  plus  $1.5$  in.).

#### WHAT OF NEW SHAFT?

**Problem No. 3**—If the six entries in the previous problem are used for intake airways and an air shaft is provided at Point C for the return, all leakage will be eliminated between A and B without repairing the stoppings. The air required at B for circulation through the workings ahead is 130,000 c.f.m. with an average resistance of 1.5 in. w.g. What pressure will be required for the fan at C, allowing 0.28 in. w.g. for the extra resistance of the shaft and airways from B to the fan?

The pressure drop from A to B and return with 150,000 c.f.m. at A and 100,000 c.f.m. at B is 1.6 in. w.g. As the points where the leakage occurs or the condition of the airways is not known, 125,000 c.f.m. ( $150,000$  plus  $100,000$  c.f.m. multiplied by  $\frac{1}{2}$ ) will be used as the mean quantity of air in the entries between A and B with the pressure drop of 1.6 in. w.g. Under typical mine conditions, this will correspond closely with the quantity of air that can be handled in these

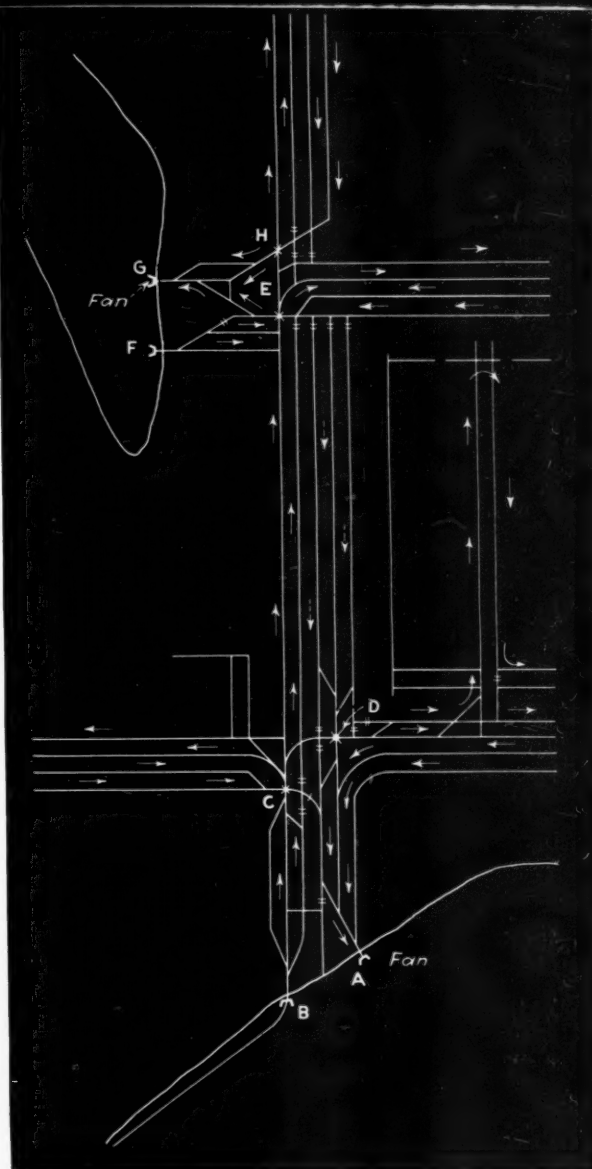


Fig. 1—Showing how mine may be ventilated by one or two fans.

same entries at the stated pressure if the leakage be stopped.

Leakage may be greater near the fan but this is likely to be offset by less favorable conditions for air flow in that section. As 130,000 c.f.m. is required at B, the pressure will be increased to 1.73 in. w.g. (X in the equation  $125,000$  squared is to  $130,000$  squared as 1.6 in. is to X), but since the air will now have double the number of airways for travel in one direction, the pressure necessary to move it from A to B will be 1.73 in. multiplied by  $\frac{1}{2}$  multiplied by  $\frac{1}{2}$ , or 0.22 in. w.g., and the pressure required for the fan at C will be 0.22 plus 0.28 plus 1.50, or 2 in. w.g. for 130,000 c.f.m.

**Problem No. 4**—If the fan at A runs continuously at a fixed adjustment and is 50 percent efficient, with a power cost of 1.5¢ per kilowatt-hour and an allowance of 20 percent for motor and transmission losses, what will be the power saving afforded by



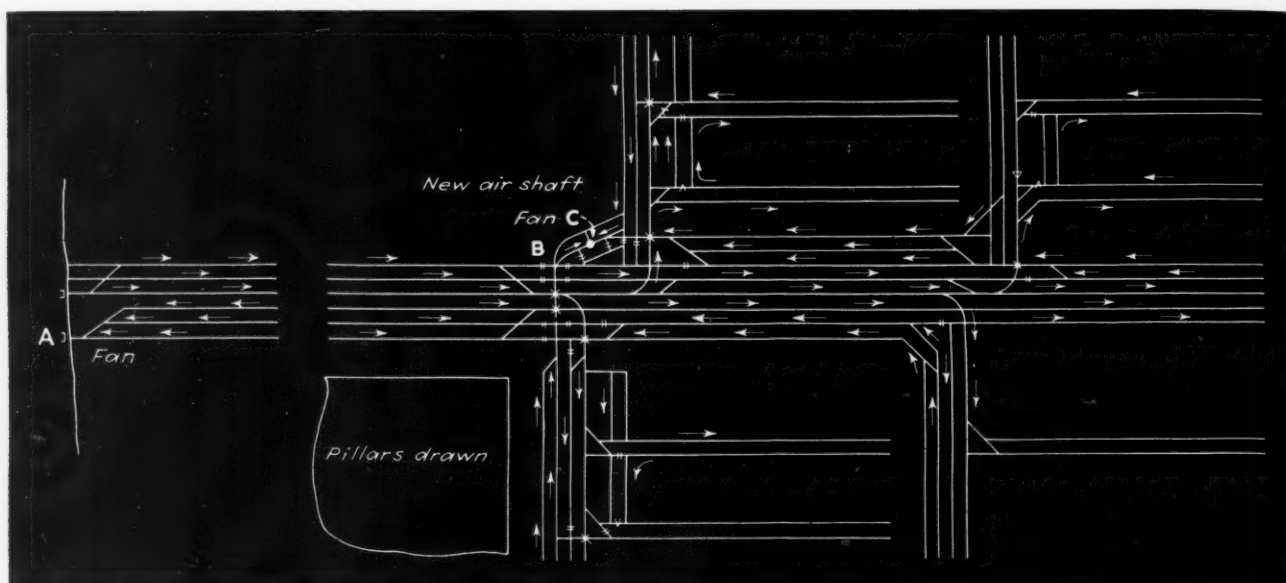


Fig. 2—Illustrating how new openings may be made to help ventilation.

a new air shaft and a 75-percent efficient fan at C? Calculating:

$$\frac{205,000}{33,000} \times 4.5 \times 5.2 = 145.3 \text{ hp. on the air for the fan at A.}$$

$$\frac{130,000}{33,000} \times 2.0 \times 5.2 = 41.0 \text{ hp. on the air for the fan at C.}$$

Thus, 104.3 hp. on the air is saved by using all the entries between A and B as intake airways and providing a new air shaft and fan at C for the return. Calculating further:

$$\frac{145.3 \times 1.2}{0.5 \times 1.34} = 260.2 \text{ kw.-hr. per hour for 50-percent-efficient fan at A.}$$

$$\frac{41 \times 1.2}{0.75 \times 1.34} = 48.9 \text{ kw.-hr. per hour for a 75-percent-efficient fan at C.}$$

Therefore, the saving by a new air shaft and new fan at C aggregates \$27,765 per year (the difference of 211.3 kw.-hr. multiplied by 24 multiplied by 365 multiplied by \$0.015). If the quantity of air can be reduced on days when the mine is not working the saving will not be as great, but to determine the actual figure the number of off days and the efficiency of the fan and drive with a smaller air delivery would have to be considered.

In these problems dealing with a new fan and air shaft at C, Fig. 2, there are four factors which unite to reduce the power compared with the requirements for the fan at A. These are: (1) elimination of leakage by carrying the air in one direction only between A and B; (2) use of double the number of intake airways; (3) saving half the length of air travel between A and B; and (4) the use of a more efficient fan. Of the total saving in power, only

about 12 percent is due to a more efficient fan at C, with the other 88 percent resulting from the improved air circuit. The power saving by sinking a new shaft and installing a fan at C is about 80 percent, in addition to other advantages.

Before opening a new mine a projection of future workings should be made as far as can be determined in advance, and this should be supplemented by a carefully studied and comprehensive plan of ventilation. For this purpose, the following, among other things, should be considered: acreage, desired tonnage per shift, expected life of the mine, method of working, thickness and general characteristics of the coal; seam, roof and bottom conditions, the probability of gas or a large flow of water and the general contour of the bottom. Sufficient surface elevations should be obtained to show the approximate cover thickness at various points and the location of streams, ridges and the like should be determined. The widths and centers of rooms and entries should be decided.

Ample airways should be provided and anything likely to occur that would affect ventilation should be taken into account, if known, including the location of future fans. Special attention should be given to the elimination of doors and crosscuts. The projection may be modified somewhat as the mine develops, but this is not likely to affect seriously the work already done, provided there are sufficient airways properly protected from squeezes and accumulations of water.

In the past, the quantity of air to

be delivered by a new fan frequently has been based on the need for more air at the face or on what some similar mine was using, and this usually has included a large quantity of air lost by leakage. Special attention should be given to the matter of leakage, both as to what can and should be done at the mine being considered. If the company has a similar mine in the same section, it may be advisable to determine a coefficient of friction for average conditions. In getting this, it will be necessary to allow for leakage or make the test in a section where there is no leakage.

Having the quantity of air required, the number of airways with their length and cross-section, the maximum leakage permitted, obstruction due to haulage and the like and a practical coefficient of friction, including ordinary shock losses, it is possible to estimate rather closely the volume of air and the pressure for a fan as located at either A or C, Fig. 2. But falls, water, heaving bottom, poorly constructed overcasts, etc., may alter the picture materially.

(Note: In the article by Mr. Dickerson in the September issue, p. 48, the word "reducing" inadvertently was inserted in the question in Problem No. 2. The problem should have read: "In Problem No. 1 it was shown that 15 percent of the power required for 100,000 c.f.m. at a 2-in. w.g., with leakage of 60,000 c.f.m., would deliver 40,000 c.f.m. from A to D and return without leakage. If there are no workings ahead of D, what will be required for 100,000 c.f.m. at D without leakage?" etc.)

# LIGHTNING DAMAGE

## Prevented by Using Proper Apparatus

Insulation of Motors and Generators Weak Against Surges—  
Arresters Not the Only Solution and Should Be Supple-  
mented by Capacitors—Arresters Out on Line Also Desirable

By J. A. CIVILETT

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LIGHTNING frequently damages motors and the result is delays or shutdowns. The insulation of motors and generators is weak against surges. If these machines were insulated to withstand lightning, they would be so large and expensive that it would be impractical to build them. With the science of protection, as it is known today, a standard machine can be protected from lightning at very little cost.

Lightning may strike any wire above ground. When it does, it divides into two waves and travels to both ends of a line. The fronts of these lightning waves are practically perpendicular, like a huge wall of water "blitzkrieging" everything in its path. Since a motor frequently is connected directly to an overhead incoming line, its weak insulation is quickly punctured and generally a new set of stator coils is required.

**Low Breakdown Arrester**—Since rotating machines are likely to be damaged by voltages greater than the test voltage (twice normal voltage rating plus 1,000 volts—for equivalent impulse or lightning voltage value, multiply by the square root of 2), a special low-breakdown lightning arrester should be provided. Low-breakdown arresters on each of the machine terminals will limit the high peak of the lightning stroke and drain it harmlessly to earth. That portion of the wave which appears across the arrester is approximately twice the voltage rating of the machine and is applied to the winding of the machine. The arresters, however, render protection only for the coils-to-frame insulation and not for turn-to-turn insulation. Therefore, arresters alone are not the solution.

**Voltage Piles Up**—When the steep-front lightning current flows through the machine coils, it has a tendency to pile up across the insulation between the first turns. The slower the front (or the longer it takes to reach its peak), the more time the front has to build up throughout the winding. This prevents a piling up of high voltage at the first turns.

This is where the capacitor comes into play. The capacitor is a device made up of sections consisting of sheets of very thin paper and aluminum foil. It has the ability to absorb a heavy lightning charge on the foil. In time this charge builds up voltage in the capacitor; the original steep wave front of the surge is slowed up. The front is flattened like a wedge and therefore a greater time is required for the surge to reach its peak.

By the capacitor's slowing up the front of the lightning wave, the voltage builds up at a slower rate in the machine windings, thus preventing the existence of dangerous high voltage between different sections. When the voltage is uniformly distributed, flashovers will not occur.

**Keep Ground Leads Short**—Both the capacitors and arresters are connected from line-to-ground with all leads as short as possible. Care must be taken to tie these ground leads, together with the machine frame, to a

good low-resistance ground. Ten ohms or less is very desirable. This may be obtained by driving several rods in earth and connecting in parallel to the ground wire. However, if the machine frame is tied to the same ground as the protective devices (as shown in Figs. 2 to 5) the effect of high ground resistance will be neutralized. If not grounded to the machine frame, there would be a difference in voltage between the machine frame and arrester and capacitor grounds, which may cause a flashover from machine frame to stator coils.

In case there are two or more machines connected to a bus, install the capacitor and special arrester on the bus, thereby protecting all machines. In such cases, a 10-amp. fuse in standard primary cutouts should be used between the bus and protective equipment.

In the remote event of a capacitor failure, the fuse will open and disconnect it from line. This prevents a ground on the bus and closing down of other machines temporarily. The arresters have the well-known dropout feature so that if destroyed, they will automatically clear themselves from the line. Fig. 4 shows protection to one machine. Fig. 5 shows protection to two machines tied to a common bus.

One thing more to complete the protection: About 1,500 ft. away from the machines, out in the incoming line, install a set of standard distribution-type arresters to reduce dangerous lightning surges originating beyond that point.

Figs. 1, 2 and 3 illustrate in a rough way the effect of a lightning surge (a) without protection, (b) with arrester only, and finally (c) with arrester and capacitors.

**Summary**—Good lightning protection should be based on the following:

1. Install capacitors at machine terminals.

TABLE I—FOR MOTORS UP TO 1,000 HP. OR  
M.G. SETS UP TO 750 KW., 3-PHASE, 25- or  
60-CYCLE SERVICE, EXPOSED TO LIGHTNING  
STROKES.

Required for ONE installation, 440 volts:		
Apparatus	Quantity Required	Install at
650-volt 3-phase 2-mf. capacitors, indoor.....	1	Machine
500-volt 3-phase arresters, indoor.....	1	Machine
500-volt single-phase arresters, outdoor.....	3	500 ft. away
Approximate net total for one installation, 3-phase.....		
\$25		

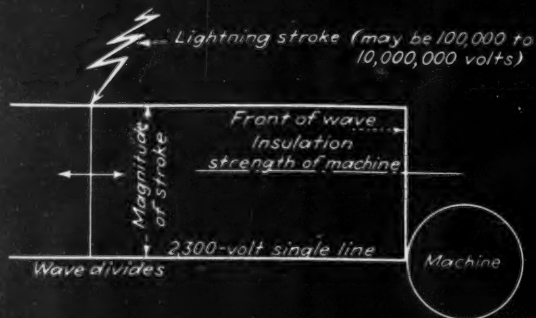


Fig. 1—Without protection lightning strokes travel to machine and cause damage.

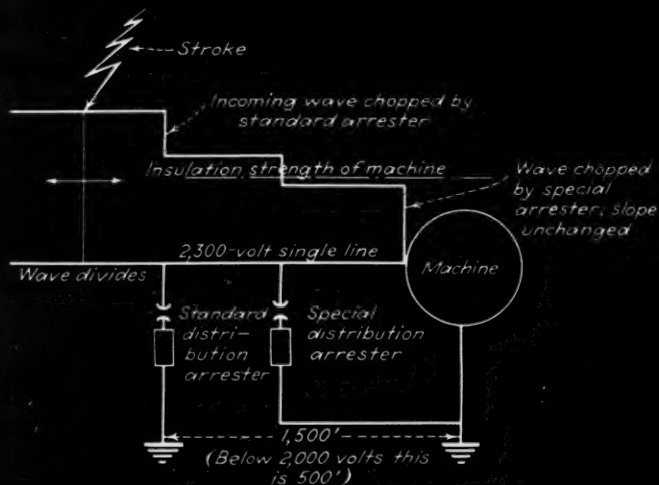


Fig. 2—With lightning arrester only. Lightning stroke chopped but slope is unchanged. Will damage machine.

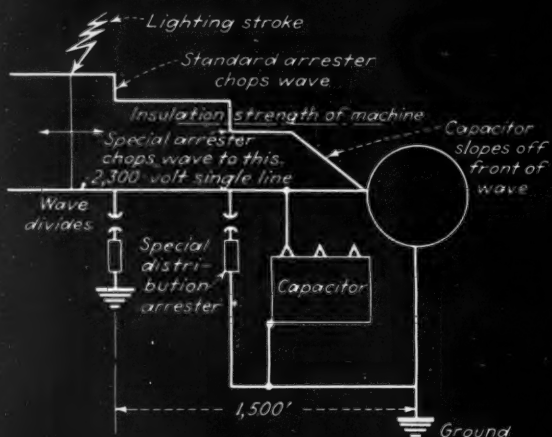


Fig. 3—With arrester and capacitor. Best protection. The arrester cuts down the magnitude of the stroke and the capacitor slopes off the front of the wave so that the lightning enters the machine coils gradually. When the peak enters the coils there is no flashover due to the potential of all the coils being raised.

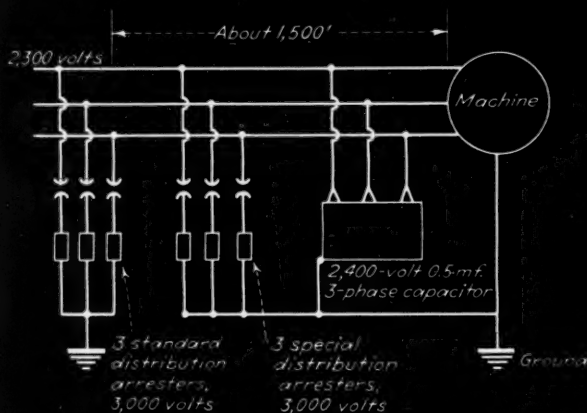
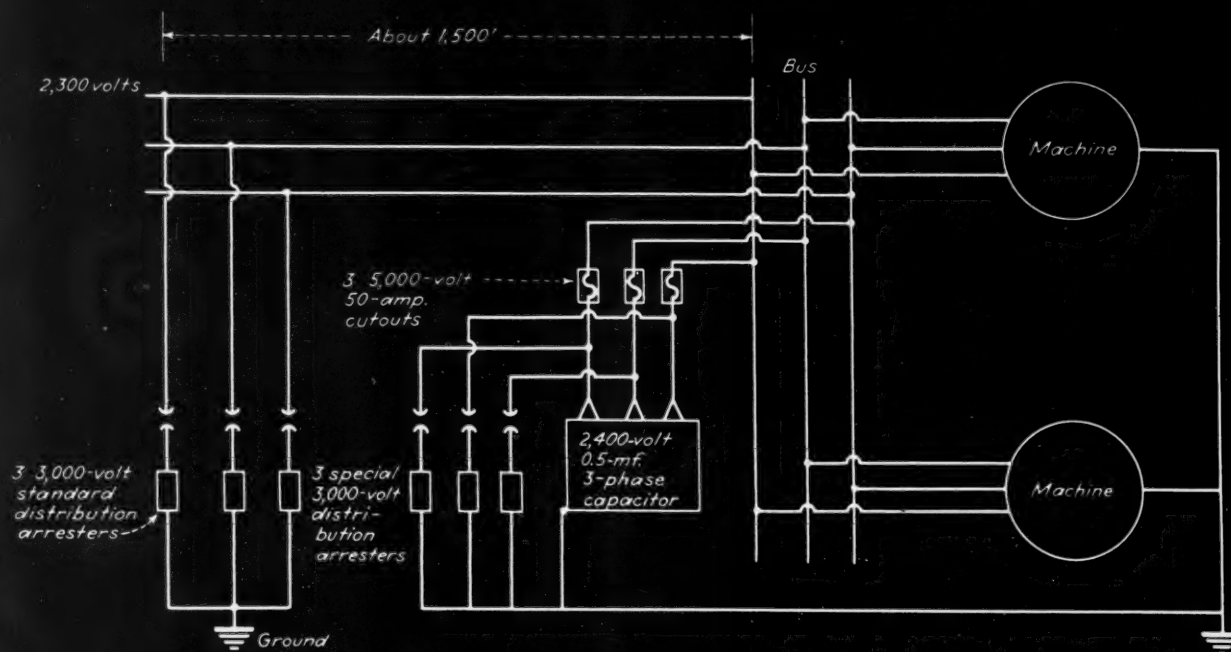


Fig. 4—Lightning protection for motors or generators up to 750 kw. or 1,000 hp. directly connected to overhead 2,300-volt 3-phase line exposed to lightning strokes.

Fig. 5—Lightning protection for two or more machines connected to a common bus. One set of protective equipment installed on the bus will protect all machines.





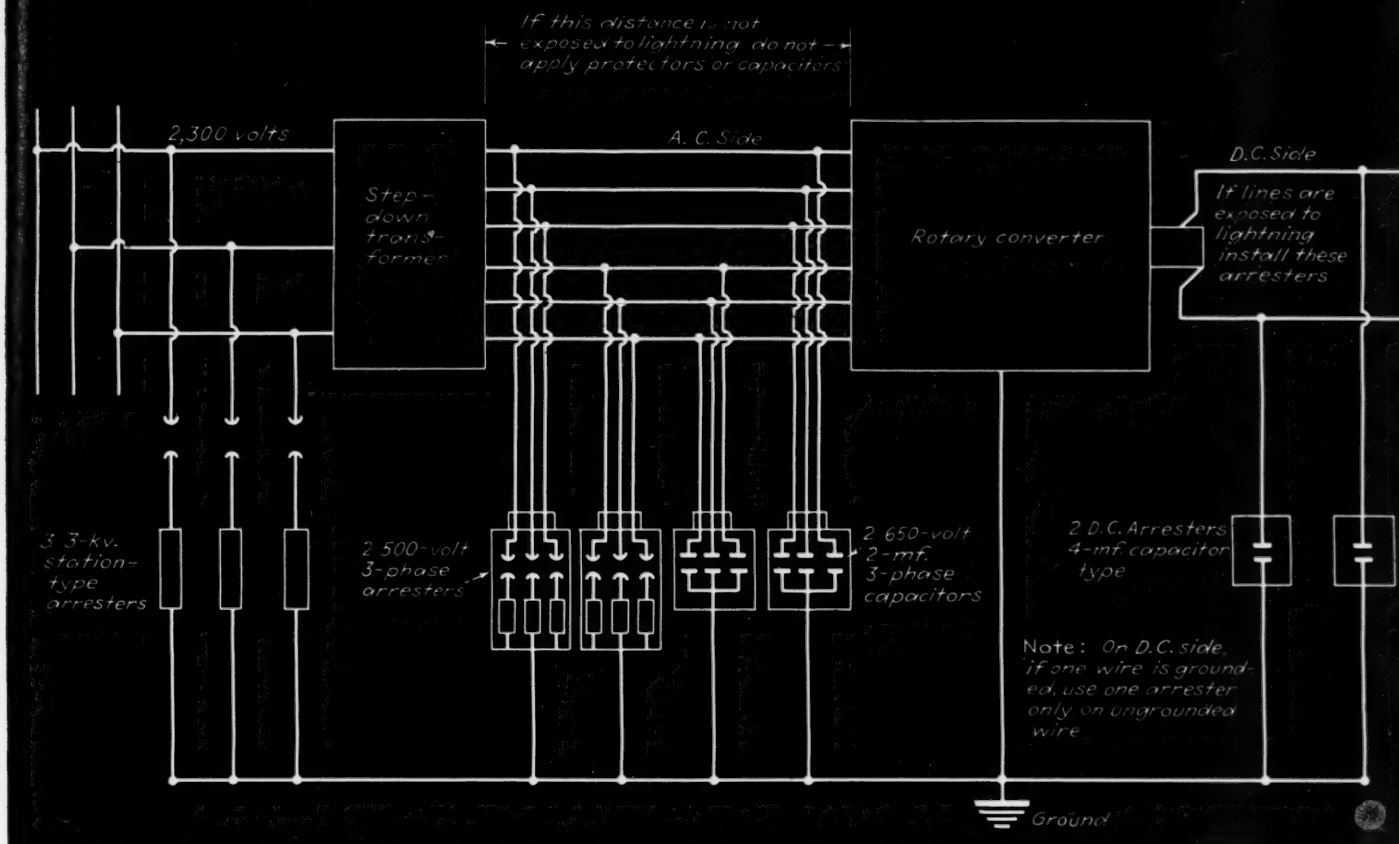


Fig. 6—Surge protection to rotary converter.

2. Install three special distribution-type arresters at machine terminals.

3. Install three standard distribution-type arresters about 1,500 ft. from the machine (500 ft. for circuits below 2,300 volts).

4. Suggested optional arrangement: When two or more machines are tied to a common bus, install three pri-

mary fused cutouts with 10-amp. fuse links between the bus and protective equipment.

A rotary converter can be protected against lightning (see Fig. 6) by:

1. Installing station-type lightning arresters on the high-voltage side of the step-down transformer.

2. Installing low-voltage arresters

and capacitors on the a.c. side of the converter.

3. Installing direct-current arresters, capacitor type, on the d.c. side of converter.

**Bibliography**—"Surge Protection for Rotating Machines," by J. F. Calvert, A. C. Monteith and E. Beck, A.I.E.E. Reference Book, p. 1178.

TABLE II—APPARATUS REQUIRED TO PROTECT MOTORS UP TO 1,000 HP. OR M.G. SETS UP TO 750 KW., 3-PHASE, 25- OR 60-CYCLE SERVICE, EXPOSED TO LIGHTNING.

Required for ONE installation, 2,400 volts delta:

Apparatus	Quantity Required	Install at
2,400-volt 3-phase 0.5-mf. capacitors	1	Machine
Special 3,000-volt single-pole distribution-type arresters	3	Machine
Standard 3,000-volt single-pole distribution-type arresters	3	1,500 ft. away
Approximate net total for one installation, 3-phase		

Optional: If the installation is to protect two or more machines tied to a common bus, add the following apparatus to the above:

5,000-volt 50-amp. primary fused-type indicating cutouts	3	On bus
10-amp. universal type fuse links	3	In cutout
Optional items only, approximate net total for one installation, 3-phase		

TABLE III—APPARATUS REQUIRED TO PROTECT MOTORS UP TO 1,000 HP. OR M.G. SETS UP TO 750 KW., 3-PHASE, 25- OR 60-CYCLE, EXPOSED TO LIGHTNING.

Required for ONE installation, 6,900-volt ungrounded neutral service:

Apparatus	Quantity Required	Install at
6,900-volt single-phase 0.5-mf. capacitors, indoor or outdoor	3	Machine
Special 9,000-volt distribution-type arresters, single-phase, indoor or outdoor	3	Machine
Standard 9,000-volt distribution-type arresters, single-phase, outdoor	3	1,500 ft. away
Approximate net total for one installation, 3-phase		

Optional: If the installation is to protect two or more machines tied to a common bus, add the following apparatus to the above:

7,500-volt 50-amp. primary fused type cutouts, outdoor, indicating type	3	On bus
10-amp. universal type fuse links	3	In cutout
Optional items only, approximate net total for one installation, 3-phase		

TABLE IV—APPARATUS REQUIRED TO PROTECT MOTORS UP TO 1,000 HP. OR M.G. SETS UP TO 750 KW., 3-PHASE, 25- OR 60-CYCLE SERVICE, EXPOSED TO LIGHTNING.

Required for ONE installation, 13,800 volts, ungrounded; machine connected to overhead line through transformer:

Apparatus	Quantity Required	Install at
13,800-volt single-phase 0.25-mf. capacitors, indoor or outdoor	3	Machine
Special 15,000-volt distribution-type arresters, single-pole, indoor or outdoor	3	Machine
Standard 15,000-volt distribution-type arresters, single-pole outdoor	3	1,500 ft. away
Approximate net total for one installation, 3-phase		

Optional: If the installation is to serve two or more machines tied to a common bus, add the following apparatus to the above:

15,000-volt 50-amp. open-type cutouts, outdoor, drop-out type	3	On bus
10-amp. universal type fuse links	3	In cutout
Optional items approximate net total for one installation, 3-phase		

TABLE V—APPARATUS REQUIRED FOR LIGHTNING PROTECTION FOR ROTARY CONVERTERS 750 KW. AND LESS (SEE FIG. 6).

Required for ONE installation, A.C., 2,300 volts, or 4,160 volts Y grounded and 600 volts or less D.C.

Apparatus	Quantity Required	Install at
605-volt 3-phase 2-mf. capacitors, indoor	2	Machine, A.C. side
500-volt 3-phase protectors, indoor	2	Machine, A.C. side
3,000-volt single-phase station-type arresters, outdoor	3	High-voltage step-down side, transformer
750-volt 4-mf. single-pole capacitor-type arresters	2	D.C. end
Approximate net total for one installation		

# ROPE LIFE BOOSTED

## By Care in Inspection and Lubrication

Records Kept for 23 Years Prove Value—Show That Weekly Inspection and Regular Cleaning and Lubrication Add 50 to 100 Percent to Rope Life—Good Lubrication Yields Real Dividends in Added Rope Service

By **FRANK YOUNG**

Hoisting Engineer, Kansas State Mine  
Lansing, Kan.

I HAVE BEEN an operator of cable-equipped machines continuously for the last 35 years. In that time I have used many kinds and types of wire cable. I have never had an accident which caused injury to a man, or serious damage to equipment. Confidence is the big factor in my business. After you have learned to operate the machine, 75 percent of your confidence comes from knowing that your cable is "right."

My confidence in wire ropes costs my employers very little money. I make weekly inspections, and every third week I give my cables a thorough cleaning, inspecting and lubricating. The hoist cables I am now using are 1½-in. plow steel, 6x19, hemp cores. They run around 1,000 ft. It takes me about 30 minutes to make a one-cable inspection. I can clean, inspect and lubricate such a rope in less than an hour. Forty hours of my employer's time per year gives me absolute confidence in my rope.

For 23 years I have kept a record for each rope in use on jobs where I have worked. My record is divided into two parts. Part one includes: description of the cable; from whom and when purchased; cost; price received for the discarded cable; who bought it; description of the initial lubrication; notes on constructional stretch and breaking-in; a description of the fittings; notes on the condition of the sheave grooves and other equipment. I like to be present when a rope I am to use is unloaded. Notes are made on the unloading, also.

The second part of my record gives dates and findings for each inspection. If the rope is examined by an authorized inspector (either insurance, State

mine or company man), my record shows the date of such inspection, the inspector's remarks, if any, and what I consider to be the exact condition of the cable at the time of the outside inspection.

Each time the rope is lubricated the date is set down with the estimated quantity of lubricant used. The condition of all equipment also is noted at each three-weeks' lubrication. If a sheave groove is damaged, a record is made as to the repairment. The amount of take-up for the natural elastic stretch is noted from time to time, and if the rope is reversed, cut, or otherwise serviced, a notation is made, telling exactly what was done and why.

Keeping this kind of a record requires practically no time at all, and it furnishes a lasting written history of every rope on the job. Such a record aids the management in selecting the "right" rope for replacements, and it has been valuable to me many times in teaching new operators the "hows" and "whys" of the game.

Weekly inspections and regular cleaning and lubricating add 50 to 100 percent to the life of a rope. My record shows that. In fact, there are no recorded exceptions. A rope given the proper care will outlast a rope which has been carelessly handled two to one.

Another thing my wire-rope record has established beyond question is that on equipment where drums are small in diameter and where rope is required to deliver high-speed work under exacting conditions, preformed rope will outlast the same quality of ordinary lay two to one.

On two identical machines—small drums—we had been using regular right-lay cables. They had been lasting us from six months to one year, depending on the work requirement and the care given them. We decided to make a test. One rope was given

weekly inspections and lubrication and changed and cut when needed. The other rope was lubricated but twice in 180 days. At the end of the first six months the rope which had not been given the proper care was badly crystallized and had to be discarded. The other rope gave us another six months' service and was in fair condition when we made the replacement at the end of the year.

We sent this record in to a wire-rope company. At the suggestion of a factory representative, we switched to preformed rope and made the same test. Very little breaking in was required to train the preformed ropes to the drums, and with just three lubrications, one rope lasted 13 months before it had to be replaced. The second rope, which had been lubricated weekly, cut and changed end to end, was still usable when it was discarded after 29 months of continuous service. The initial cost per foot on the preformed was higher—not quite 20 percent more. However, considering the longer life, the preformed rope proved much the cheaper.

Preformed rope is not suitable for many types of work and equipment, but under conditions which carry a company engineer's recommendation for preformed, there is no comparison in the job the rope will do nor the yearly per-foot rope cost. The safety factor alone is worth the additional initial outlay.

My wire-rope record has been especially valuable to me in teaching green operators how to take care of their cables. When you are able to prove to a man in black and white that in case after case regular inspection and lubrication double the life of a rope, that man usually is willing to accept your method. If he doesn't, it's a pretty good sign that he will never make a wire-rope operator.

In convincing a new operator of the

necessity for frequent and proper lubrication, I have found a sample of rope valuable. Regardless of how well a man understands the construction of a wire rope, he can better realize the need for care when one of the strands is taken out and he is given a chance to see the moving surfaces as the remaining strands are forced back and forth into reverse arcs. A demonstration of this kind also will give the beginner a better idea of the job of getting the lubricant worked into the rope so that it reaches every moving surface.

There are a number of ways to apply lubricant to a wire rope. The type of rope, the conditions under which it is being used and the operator's individual preference are the determining factors. I was taught that the best method was to work the lubricant into the rope by hand.

#### LUBRICATION ESSENTIAL

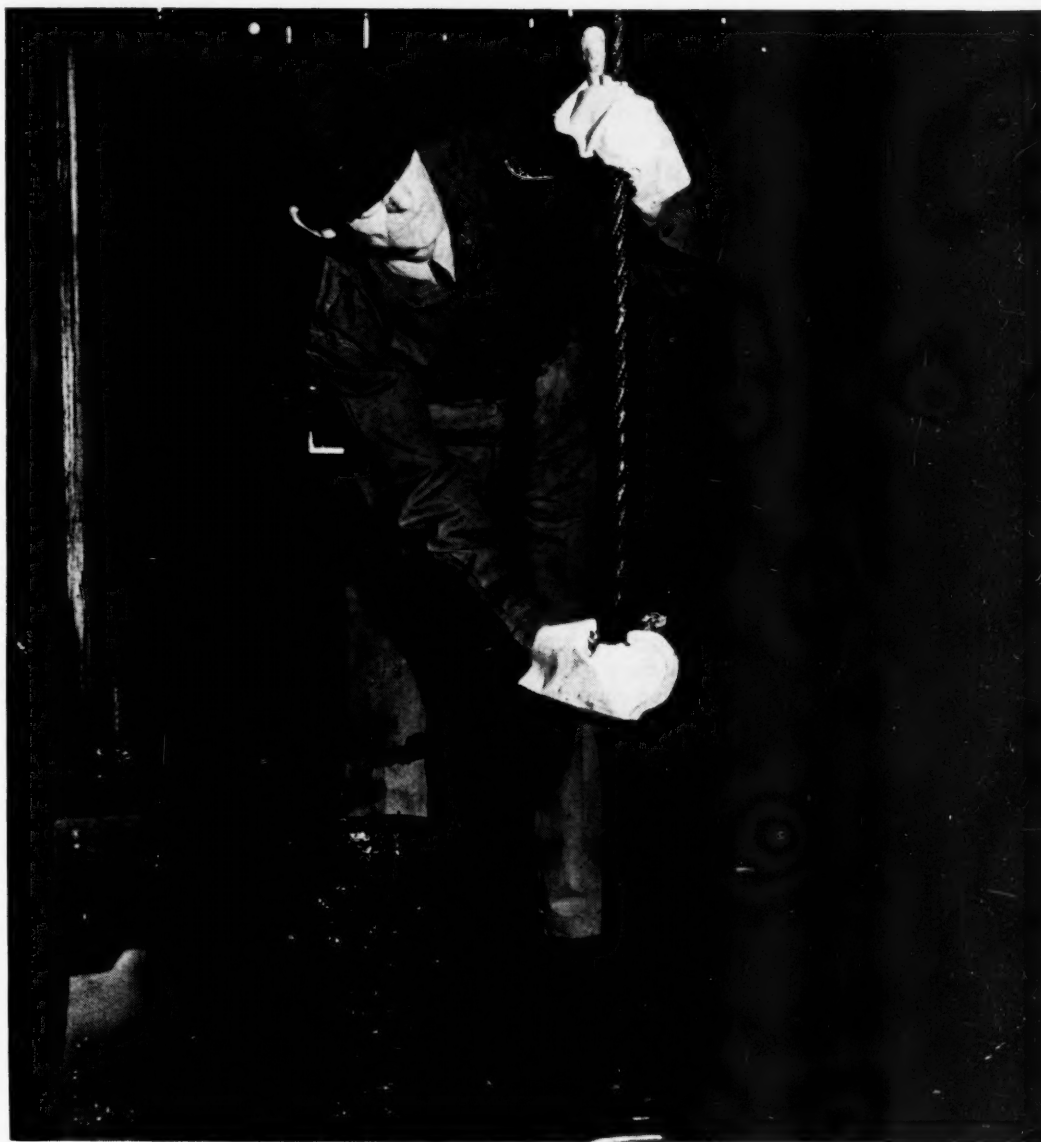
As to the type of lubricant, I like to rely on company recommendations. The main thing is to see that the rope is lubricated. Any lubricant is better than none. We had a hoist cable crystallize on us one time. Because our lubricant was too thin, the superintendent gave orders for "No lubrication until the heavier grease arrives." When the heavier lubricant did arrive it was applied to a new cable.

I have had a good many operators tell me that I was "cracked" on the subject of inspection and lubrication, and I'm inclined to agree with them to a certain extent. I think that I have overdone lubrication in some cases. But, to offset this, I've never had a single cable go bad on me for the lack of it, unless it was a superintendent's orders. I have never had that worried-wondering feeling, or had to ask my fellow workers if they thought my rope was safe.

I don't think any operator can have confidence in using a wire-rope-equipped machine unless he makes it his first job to look after that rope. Suppose you are operating a hoist and you are bringing up a dozen men per cage. To know that your rope is okay means everything to that job. It has meant enough to me that I quit one job because I was not allowed to have confidence in my rope. On this job, three months after I left, the cable broke and the safety hooks failed.

Every operator of a wire-rope-equipped machine can have complete confidence in his cable if he keeps a record, and makes inspecting, cleaning and lubricating his own individual job.

The author, who says "I was taught that the best method is to work the lubricant into the rope by hand," starting on a job.



Two ropes used under identical conditions on like machines. The top one was lubricated regularly and given proper care, and has seen a full year's service. With but three lubrications in 180 days, the bottom one was through in six months.





# ANTHRACITE FLOOD

## Suggests Need for Better Stream Control

Glacial Drift or Loose Material May Aggravate Sudden Floods by Blocking Water Courses—Encroachment on Channels, Improper Bridges, Etc., Add to Problem—Remedies Include Water-Shed Study and Proper Patrol

By R. DAWSON HALL  
Engineering Editor, Coal Age

AT FLOOD PERIODS, areas covered with loose deposits of glacial drift are likely to cause widespread destruction to surface properties, wherever the ground is steep enough that the streams can gather up trees, timber and drift to form dams. Hence, if shallow or outcropping dipping mines are operated in such areas, they may suffer from sudden flooding even when the several approaches from the surface appear to be at elevations sufficiently high to afford complete immunity.

Such loose material, containing no clay to bind boulders, gravel and sand together, is found in the northern anthracite field, which lies just north of the line where two or three separate advances of glaciation reached their limits, the last of which, known as the

Wisconsin, extended as far south as Berwick, though, according to authorities, earlier glaciation reached Selinsgrove, on the Susquehanna, and Riegelsville, on the Delaware. Here in a "terminal moraine" covering the region was dumped all the debris the glaciers had industriously collected from the mountains which they passed. Thus the slopes of that region are subject to rapid ravelling causing small dams of detritus to form around lodged timber, which later may break, with disastrous consequences. The effect of this on the mines of the Hudson Coal Co., in Lackawanna County, Pennsylvania, is suggestive of what may be expected in other sections having similar deposits of unconsolidated gravel.

As the result of a flash flood which began with a torrential rain, Friday, May 22, 1942, at 9 p.m., fortunately when the mines were practically deserted, the entire valley of the Lackawanna River was flooded and the

mines within it were all severely threatened, in some places seriously damaged and in a few instances entirely put out of operation.

Jermyn was laid entirely idle by the flood to June 22, or for 30 days, with No. 18 tunnel in the Dunmore bed inoperable until Aug. 1. Marvine and Olyphant were out of commission only three days but part of Olyphant colliery was idle from May 27 to June 1, five days, with some places inoperable still longer. The downpour continued through the next day, May 23, and was followed for some weeks thereafter by lesser storms at irregular intervals. In consequence, the large pumping capacity of all the company's mines was taxed to the limit every hour of every day for more than five weeks delivering 174,000 g.p.m.

At Marvine Colliery, the water reached its maximum elevation within 24 hours, though in the last prior flood it took nearly a month to reach the

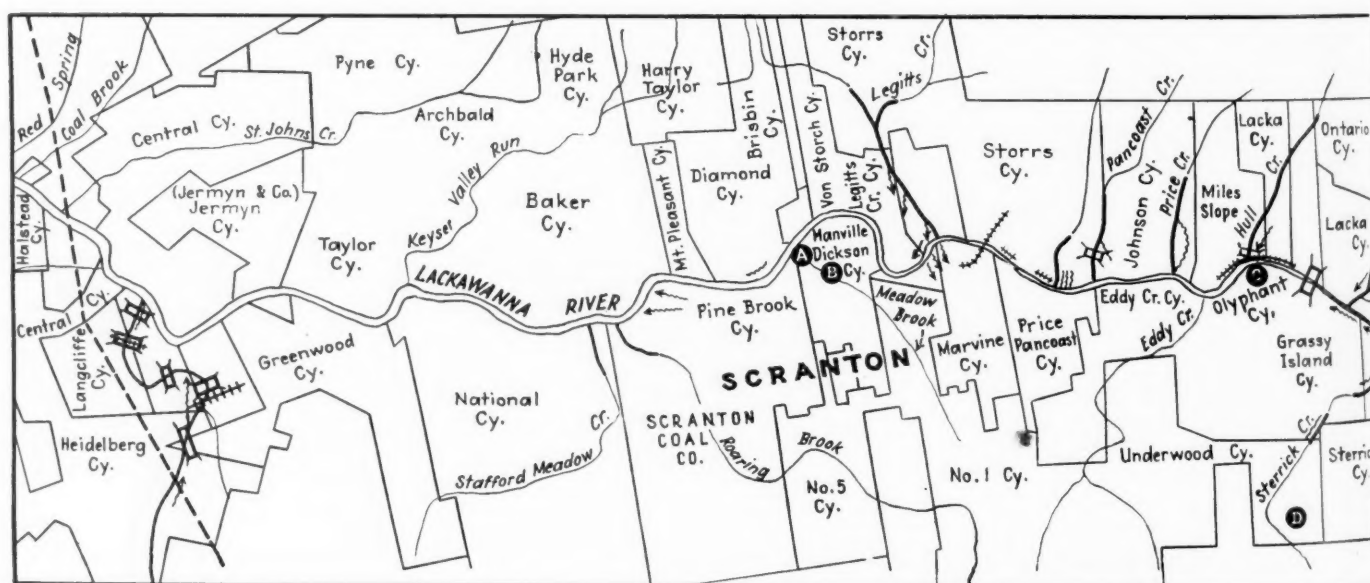


Fig. 1—Part of the Lackawanna Valley indicating surface damage done and location of collieries: A, Manville-Dickson shaft.

same point. Though water was pumped from the Marvine sump from May 22 to June 26 practically continuously for 24 hours a day and seven days a week, the water level was not lowered more than a few inches. Pumping has continued practically without letup since that date. As a result the water level has been reduced from its maximum of 269.27 to an elevation on Aug 13 of 250.77 ft., the normal elevation being 240.00, so that after nearly three months of continuous pumping, only a little more than half the surplus had been removed, because of the extremely heavy rainfall during June and July, during which 0.4 to 1.25 in. of water fell in 24 hours on nine separate occasions.

Jermyn Colliery is equipped with a pumproom normally submerged 45 to 48 ft. but which cannot be flooded except from the surface, because the connections of the pumproom with the mine have been closed by bulkheads and only the interiors of the pumps can be entered by the environing water of the sump. Though these pumps are at a level of 664.2 ft. above mean tide at Sandy Hook, they were surrounded by water reaching a height of 824.2 ft. or to a total depth of 160 ft., the bulkheads protecting the pumping machinery and their tenders from the entrance of water; approach and retreat being provided by a slope specially driven for that purpose.

The quantity of water pumped from the property in the first five weeks totaled 8,769,600,000 gal. (36,540,000 tons), or a cube of water measuring 1,055 ft. in its three directions. In an

open letter to the City Council of Scranton, June 24, Cadwallader Evans Jr., Hudson Coal's vice-president and general manager, declared that it would be at least two months after the beginning of the phenomenal rainfall before enough water would be pumped out of the mine to restore normal conditions, and this estimate he conditioned on no other flood occurring in the meantime. However, very heavy rains occurred in June and July, so that by Aug. 13 normal conditions still had not been restored.

Damage he estimated at \$200,000, exclusive of the loss from decreased production, which has been estimated at 100,000 tons of merchantable coal. Actual figures collected since show the estimate to have been substantially correct. Of the seventeen mines of the company in the Wyoming region, the flood seriously threatened seven.

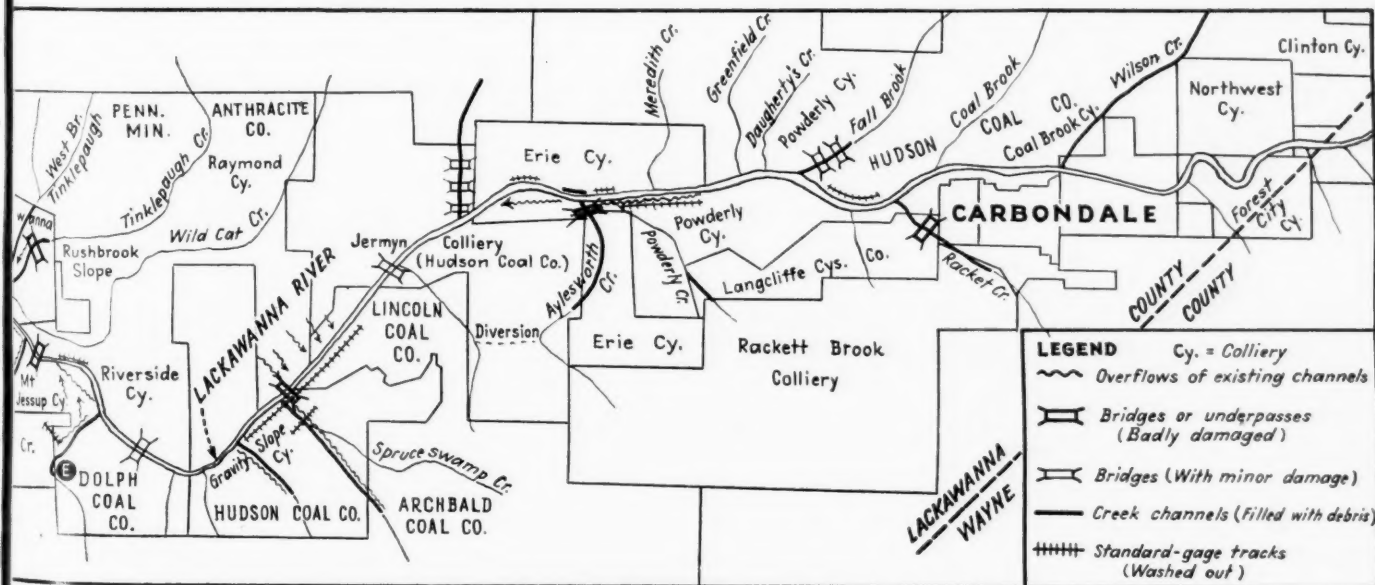
Moreover, water impounded in 13 separate operations in the area surrounding the Hudson Coal Co. mines in Lackawanna County is estimated at 5,000,000,000 gal. The underground area affected, continued Mr. Evans, is 7 miles long and 2 miles wide. "The only thing that saved us," he wrote, "was that the rainfall lasted only a few hours. If the flood conditions had continued for 24 hours longer, at least 5,000 men employed by the company would have been thrown out of work, and it would have been at least six months before they could have been restored to work and during that time an output of 500,000 tons would have been lost."

A somewhat detailed recital of the

surface effects of the flood is necessary to indicate what precautions should be taken to reduce the damage of other such occurrences, for they seem to be repeated at intervals. The Manville Shaft, 336 ft. deep, part of the Hudson Coal Co.'s Manville-Dickson Colliery (A, Fig. 1) was abandoned many years back, and in November, 1931, had been closed by a concrete arch about 50 ft. below the surface. Though it was located well above the gentle valley of Meadowbrook Run and still further above the Lackawanna River, where it did not seem likely that any flood could disturb it, the concrete failed and a torrent of water descended the shaft. Since that time, the shaft has been completely filled with clay.

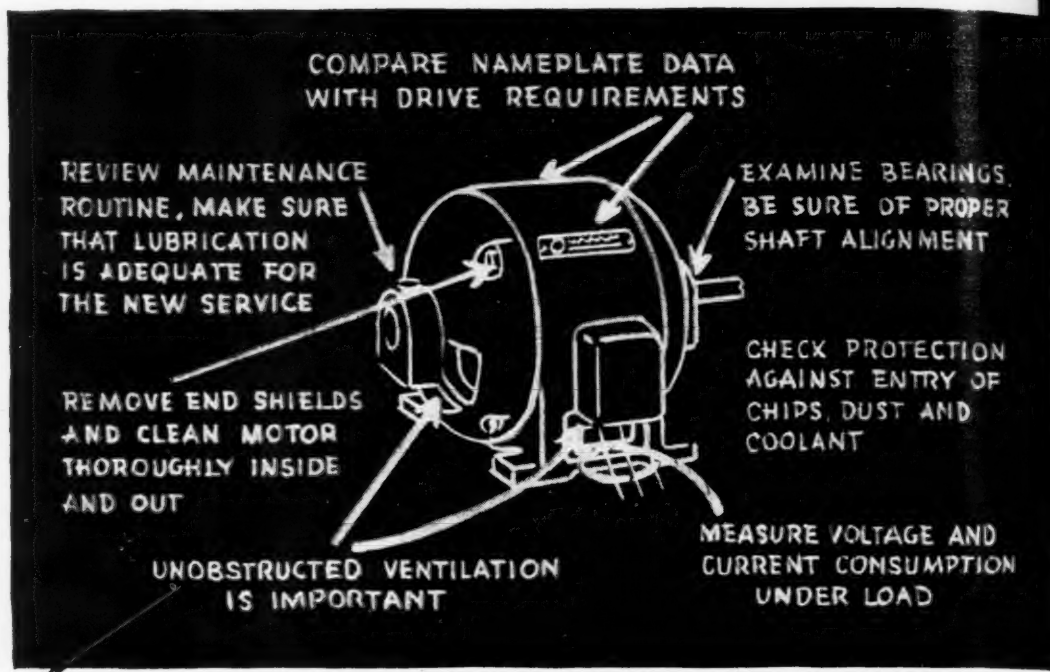
Meadowbrook Run usually is dry, and no one expected it would develop into such a violent torrent. Because the glacial drift in the northern anthracite region is loose and contains large unfilled interstices, most of the water in periods of low precipitation filters through the gravel and travels along the bedrock, leaving the stream beds entirely dry, and apparently, for that reason, they have failed to impress both highway and railway engineers and the public with the possibility of the floods of water they are likely to carry at times of cloudbursts. In consequence, inadequate preparations have been made in the past against the occasions when the glacial drift is full of water and on top of that a heavy fall of rain occurs.

Also in the Meadowbrook valley is the New York, Ontario & Western R.R. station (B, Fig. 1), where the



flooded; B, N. Y. O. & W. station, flood broke into mine; C, town of Olyphant; D, silt dump washed away; E, flooded slope.

# it's time to be a crank about

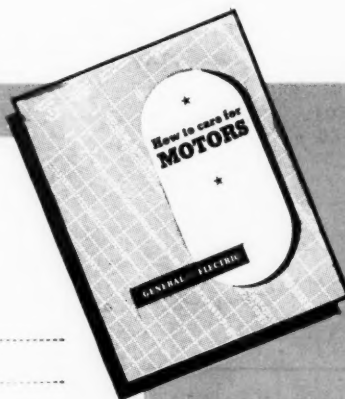


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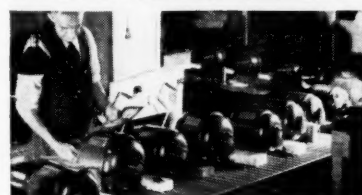
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depth of the flood was about 3 ft. Here, the railroad crosses an oxbow-bend of the Lackawanna River, traveling along what possibly may have been an old course of that stream. At this point, the water found a weak spot under a high retaining wall protecting the track from the raveling of the bluff above it, and entered some old and shallow workings in the Diamond seam, bringing down 100 or more linear feet of wall and admitting about 100,000 g.p.m. of water, which flowed for about 12 hours before it was cut off, all of which added to the flood, that the Hudson company had to pump out.

It may be years before a roof above shallow workings will fall in; until a flood occurs, they may remain intact, as apparently they did at the N.Y.O.&W. station. The quantity of water thus admitted may involve a greater expense for its removal than the profit on the coal extracted ever can compensate. Fortunately, foremen in earlier days frequently left such coal in place, recognizing that it needed much timber, yielded coal of bad appearance and provided places in which workmen did not care to work, especially when it lay remote from the gangway.

Ascending the Lackawanna from the railroad station mentioned, it may be noted how extensively the natural flood plains of the river have been ap-

propriated by riparian owners for villages and factories. These in places have taken all except the area that the river utilizes at low water and have frugally built high walls to hold the river in place, sometimes thereby diverting the stream, as at Olyphant (C, Fig. 1), from its natural direction, as well as appropriating its flood plain. The flood retaliated by filling many of the store basements in Olyphant with water and detritus, to the great disgust and cost of the merchants.

Hull creek, entering on the right\* bank of the Lackawanna in Blakely Borough almost across from Olyphant is normally almost dry, but, in the flood, the space between the walls by which it was lined by the Works Progress Administration was filled with a raging torrent carrying with it much glacial drift and also the contents of some small refuse dumps of a defunct coal company. The local authorities have had to clean this channel with power shovels.

Strange to note, Pancoast and Price creeks, further up the river and also entering the right bank, contributed little damage, probably because there was a paucity of glacial drift, as the

\* The customary practice of designating the banks of streams as "right" or "left" according to their direction in traveling down the stream is followed hereafter even though the narrator is traveling up and not down the river.

rock exposures demonstrate, though further up the river the drift proved troublesome enough. Sterrick Creek, a tributary entering on the left bank of the river, on the other hand, comes from an area where glacial drift is plentiful. It is fed by Moosic Lake and has a large drainage area. Heading in a mountain that was the source of the contemporary flood of the Lackawanna River in Wayne County, in which Honesdale suffered so grievously, Sterrick Creek was badly flooded.

Many years ago, before the Dolph Coal Co. went out of existence, that company dumped on the edge of Sterrick Creek a bank of refuse of unusually high grade (D, Fig. 1). The water, when the stream contained any water, traveled harmlessly enough on the right side of the dump, but during the flood it switched to the left side and carried most of the refuse with it in its mad rush to the Lackawanna River. A large stripping lay to the west, or left, of Sterrick Creek, but fortunately the flood was not diverted so far in that direction as to erode the piles of stripping; otherwise a large quantity of the material there deposited would have been carried to the Lackawanna.

#### BEWARE LOGS ON HILLSIDE

Next stream to the east is Grassy Island Creek, also a left-bank stream, having Pompey's drift on its left bank, in which operation pillars still are being drawn from the Clark bed. On the right bank is an old long-abandoned rock slope descending to the Clark seam (E, Fig. 1). Fortunately, the water did not enter the drift, but it poured into the old rock slope, which in earlier floods it had never been able to reach, and probably it would not have done so on this occasion had not the stream become blocked by timber and trees which, swept forward by the flood, were carried down to a road culvert which prevented their further travel.

Not only should the size and direction of all culverts and their freedom from actual obstruction be a matter of interest to the coal company but the streams and their immediate sloping sides should be freed from transportable material. In this instance, the rock slope has since been blocked by a temporary barrier and a concrete stopping is to be built. Like provision can be made of the Pompey drift, as soon as the last pillars have been removed.

The lower reaches of Grassy Island Creek near the main road from Scrant-

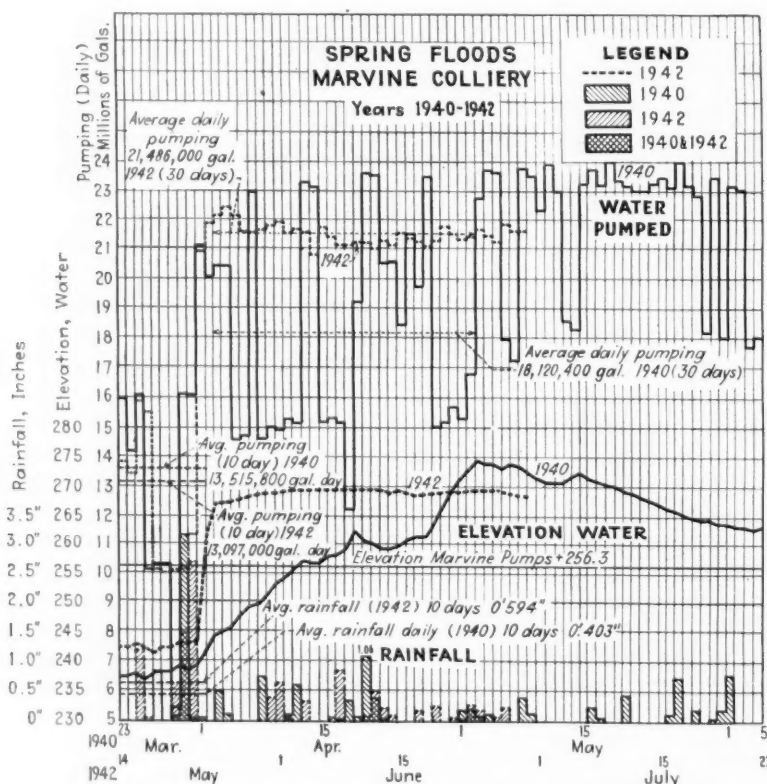


Fig. 2—Comparison of floods at Marvine colliery in 1940 and 1942.

ton to Carbondale had been walled on both sides by the Works Progress Administration with revetments about 8 ft. high. This waterway was completely filled with debris, which covered the tops of the walls to a depth of at least a foot, by the flood which moved even buildings from their foundations. Further surface devastations between this point and beyond Carbondale might be instanced but enough perhaps have been recorded to suggest all the needed remedies.

On behalf of the coal companies, it may be said that the mines furnish an involuntary reservoir that serves as flood protection and to some extent takes care of detritus. However, the company does not expect much solid material has entered such portions of the mine as will make the removal of such detritus necessary. Nine billion gallons, the quantity of flood water pumped in only the first five weeks from Hudson's mines, is the equivalent of a lake of 1,000 acres, with water 27½ ft. deep at every point.

Experience has shown that no matter who is to blame for flood damage, whether federal, State or local authorities or citizens, coal men and railroads are likely to stand most of the brunt for the errors and wrongdoing of the other members of the community. In a large degree, no care can prevent damage, and it seems bound to be supernatural where loose glacial drift is present, though not all glacial drift is of that character; in fact, such looseness as is characteristic of the drift in the northern anthracite region is rather unusual elsewhere.

#### ORGANIZE FLOOD DEFENSE

In this case, blame for the flood is laid on the mining companies and railroads by the local newspapers. Study of the course of the flood in question shows that storage yards and strippings in soft rock and shale in steep sidehills have great possibilities of mischief and indicate that any company would do well to assess these possibilities and guard carefully against them. Refuse dumps naturally, but often unfortunately, have been placed on low ground, as gravity then helps in their disposal, yet if placed on slopes, they may break loose during heavy rains and do immense damage and even cause fatalities. Choice of a place for such dumps is a major problem too lightly treated in days gone by.

When a proper plan of land drainage has been selected, vigilance is needed to see that properly located channels are large enough and kept

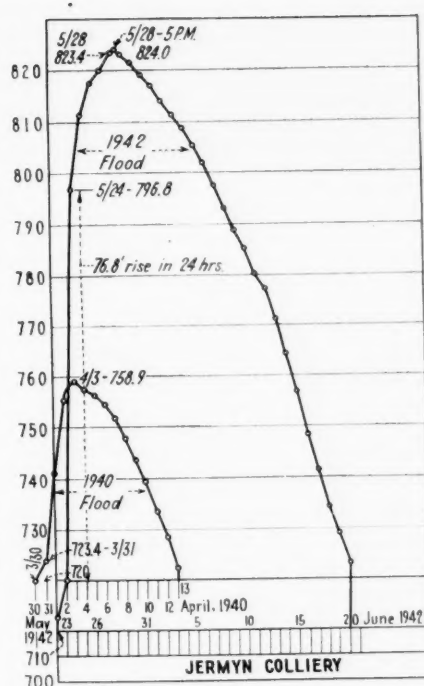


Fig. 3—Floods in 1940 and 1942 at Jermyn colliery, Hudson Coal Co.

clean enough that the water will be guided through them and not be diverted into storage yards, strippings or refuse dumps. Every company should have its property patrolled by its manager, superintendent or foreman and, if a large company, also by some special and responsible person who knows the potentialities of floods. This man should be provided with workmen who will make all needed repairs. The railroads have long ago learned the desirability of such constant vigilance.

This interest should not restrict it-

self to the company's own property. Where another property has outcrops, cave holes (real or anticipated) or openings that will let water into lower workings of the company's property, that alien property should be closely scanned and if the holder cannot be made to make the requisite adjustments, they must be made by the company whose operation will be affected. The burden borne by the coal company in pumping out the mines and in removing debris above ground and below it gives it a just cause for taking a major part in the discussion of all flood problems in the watersheds in which its mines are located. As the increasing burden of water handling so threatens the solvency and continued operation of the mines that the public is disposed to demand that the State or nation should take a hand in the matter, such action on the part of the coal company should be welcomed.

Unfortunately, experience has shown that it always is difficult to assess relative responsibility for conditions brought about by the combined actions of several persons. In general, the longest purses or the purses of the persons who do not reside in the community and have no word in local councils have to settle not only for their own actions but also for the actions of those who proclaim most loudly their title to compensation or for the action of the officials that the would-be compensatees have put into office. Consequently, the coal company must patrol the region and protect itself against the negligence of others as also against the possibility of its own negligence.

#### PUMPING EQUIPMENT AT MINES, HUDSON COAL CO.

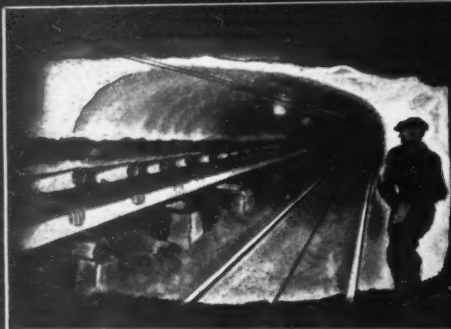
Colliery	Service	Lift	Pumps	Gallons per minute		
Jermyn	Pumps below Archibald bed	113 ft.	4 pumps	3,200 each		
	Lift prior to flood*		4 pumps	5,800 each		
			1 pump	1,000†		
Olyphant	Top Clark to surface	438 ft.	3 pumps	2,825	37,000	
	Top Clark to 14-ft. bed	85 ft.		3,400		
				3,000		
			3,000			
	Miles Slope Eddy Creek Shaft	Rock bed to surface	207 ft.		1,500	12,225
14-ft. bed to surface		389 ft.	2,250		1,500	
			2,250			
			5,200			
			7,500			
•				3,000‡		
	Birdseye Marvine	Birdseye to No. 3 Dunmore	329 ft.	2 pumps 1 pump	2,600	20,200
		Dunmore No. 2 to Surface	494 ft.		6,200 each	
6,400						
					18,800	
					89,725	

\* All pumps are centrifugal except the first two listed in Eddy Creek Shaft. The lift given is from the top of the water in the sump prior to the flood. The vertical distance of the pumps from the surface is 160 ft.

† Pumps installed to remove leakage.

‡ An emergency pump.





# THE FOREMEN'S FORUM

## New Wrinkles in Fighting Anthracite Fire Developed at Hazle Brook Mine

**Hydrogen, Old Timber and Pitching Measures, Shallow and Creviced, Proved to Be a Trying Trio at Continental Mine, Though Methane Was Absent—An Archway Was Built to Close Off Old Burning Workings, and Yet Let Cars Travel From New Mine to Shaft; Silting Did the Rest**

INGENIOUS and unusual methods of control marked the suppression of the fire in the Continental mine of the Hazle Brook Coal Co., Centralia, Pa., described by S. H. Ash, for himself, W. C. Jones and E. W. Felegy at the meeting of the Anthracite Section, American Institute of Mining and Metallurgical Engineers, April 11. Reference was made to his address in the May issue, p. 71, but amplifications of the details of Mr. Ash's remarks seem justifiable.

On the second level and at a depth of 300 ft. below the surface, a fire started May 13, 1940, about 75 ft. from the bottom of the main hoisting shaft, attacking the timbers by which the old Westside Gangway of the Mammoth seam was lined. This section of the gangway contained an electrician's shop, an underground hospital and the foreman's shanty. The Mammoth seam is here about 30 ft. thick and plunges upward to the north on a pitch of 45 deg. to an outcrop, where a stripping has been operating in which, by sliding the bucket of the dragline down the inclined seam and under the rock cover, coal has been extracted somewhat beyond the confines of the bottom of the actual open pit. The outline of this strip pit lies a few feet to the north of the area covered by the plan of the mine workings, as shown in Fig. 2.

**Built an Archway as a Fire Stopping—**The fire ultimately took so complete a hold of the mine that the management, State mine inspector and engineers from the U. S. Bureau of Mines decided they could fight it only by sealing. For this reason, Mr. Ash proposed that an archway, of sufficient height and width for two tracks, be erected, of Schaefer lining blocks, in the roadway which leads eastward at coal level to No. 10 tunnel, which latter, like the shaft lining, is located in solid rock. Thus the archway would connect the rock tunnels at either end as the gangway always had done before the arch was constructed. At first, the archway was not actually in the fire area, but before it was completed the fire had reached it, thus making its construction difficult.

When covered with a heavy layer of slush through boreholes driven partly from the surface and partly from the workings, the well-buried archway ultimately would act as a tight stopping and suffocate the fire completely, incidentally isolating the fire area from the rest of the mine. This plan was adopted, but not until direct fighting seemed destined to fail. By this provision, the workable portion of the mine and the shaft were made ready for operation as soon as the fire area and the area above the arch were completely slushed. In fact, work was resumed at the mine Aug. 19, 1940.

**Natural Ventilation Hinders Firefighters—**When the fire broke out, the mine, around the shaft, was being ventilated by air set in motion by the differences between the temperatures of the mine interior and the surface, but, in other parts of the mine, ventilation was provided more definitely by a pressure fan installed on the surface at the east end of the property. This fan had a rated air delivery of 60,000 cu.ft. per minute. But with this dual arrangement, the shaft was on natural ventilation and whenever the air descended in the main hoisting shaft, it carried smoke from the fire area toward the fire fighters so that they were unable to reach that

exit. When the ventilation reversed, the main escapeway was shut off, and approach to the fire was dangerous. In either case, carbon monoxide was sure to make trouble.

At first, the fire was attacked by men armed with soda-acid extinguishers and wearing gas masks, but when the supplies of soda-acid were exhausted, no means was available for fighting the fire, for all the water entering the mine above the level of the shaft bottom is carried away by a rock tunnel and at the second level only a 1-in. water line, which had been used by the rock drillers at the foot of the shaft, was in place and even that was not furnished either with hose connections or hose.

To meet the lack of water, the Centralia Fire Department lowered a hose down the shaft and for 7 hours pumped water on the fire. Meantime, a 2½-in. hose was let down the shaft and a 2-in. line installed to connect it with the surface supply of the colliery, which was a 4-in. spring-water line. But, this water proving insufficient, the fire company had to be recalled, and this time pumped water on the fire for 15 hours. Thereafter, an electric pump was installed at the shaft for that purpose. Water was available in the Raven Run mine adjacent, but before this water could flood the mine a 160-ft. hole must be drilled in the barrier pillar and men must travel within the fire area to place and erect the bulkhead by which the water would be retained. Moreover, the water in Raven Run mine would not rise by gravity as high as the fire might extend, and no other water supply was available.

**Held Fire While Archway Was Constructed—**Between May 25 and 31 inclusive, two drillholes were started and one was completed. Work on the archway started at the end of that period. On May 25, large quantities of red-hot coals rolled down the pitch onto the gangway, arriving faster than the cooled coal could be removed. Hence, to prevent extension of the fire, construction of a bulkhead was begun 30 ft. outby the pillar chute where hot material was being loaded. This was followed by the erection of a second bulkhead 25 ft. outby the first, and these together prevented the fire from working outby and restricted the flow of air to the fire.

The compression blocks of creosoted wood inserted between the arch blocks (voussoirs) in most Schaefer lining construction, and occupying the same place in such work as the lengthwise joints in a regular arch, were omitted in this

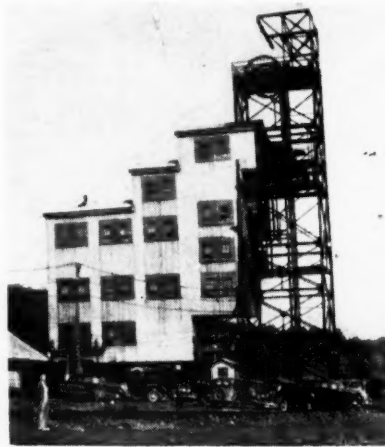


Fig. 1—Headframe of Continental shaft.

archway, for, if inserted, they might have been burned out, and they were not needed structurally, for the mine was not squeezing and the arch could hold up all the weight that would rest on it and would not need to rely on the jamming of rock surfaces as means of escaping from the destructive pressure of the overburden. The Schaefer lining was supported on either side with an underpinning wall of building brick cemented together, the wall being sufficiently high to keep the Schaefer lining above the acid mine water.

As each section of Schaefer rings was completed, sheets of mica-coated asphalt roofing were laid over their outside surfaces, and silt was run in so that the water would not run too freely through the interstices between the several blocks, which water, being acid, might adversely affect the cement of the arch.

**Started Work at Center of Archway—** The widest and most heavily timbered section between the shaft and No. 10 tunnel was near the turnout switch to the Mammoth gangway. If the fire had gotten into this heavily timbered section, it would have made work extremely dangerous if not impossible, so it was here that the Schaefer lining was commenced. When constructed at that point, it was tied into

the footwall of the Mammoth bed and No. 10 tunnel, the farthest point from the shaft. Thus connected with No. 10 tunnel, which had an outlet to the surface, it still probably would have been possible to extend the Schaefer lining toward the shaft even if the fire should approach the archway as it was being completed.

(To be continued)

### With Coal, as With Metal Dust, It Is Fineness That Does It

Coal is relatively inexplorable, not as dangerous as aluminum or magnesium, though these metals seem to be such harmless, incombustible solids. They will not explode except when reduced to fine dust, and coal will not explode so long as it is not similarly fine. Anthracite will not explode even when it is ground to dust, showing the inertness of carbon or near-carbon, and pure carbon will respond only to liquid oxygen. The moral of this disquisition is that it is the powdering of coal alone that makes it dangerous.

Low-volatile coal is so brittle that, in mining, it is pulverized more finely than any other. That is why it is so dangerous. By breaking high-volatile coal into powder,

it also becomes a menace, and frequently, in mining, it becomes extremely fine, but less frequently than low-volatile coal. So the high-volatile coal men should be cautious because their coal is so explosive, and the low-volatile men because their coal so easily produces much very fine-size material. Only when both kinds of coal are ground to a similar fineness does the low-volatile coal exhibit the lesser explosibility.

An investigation into the friability of samples of coal from 47 mines in 17 different beds made by the U. S. Bureau of Mines in the Alabama coal fields showed that though friability and volatile matter content do not vary according to infallible rule, there is, in general, an increase in friability with every decrease in volatile-matter content. It may be added that, if it is noted that the coal dust in a mine is fine enough to enter so far into the pores of the skin that it is almost impossible to wash it out, that mine is quite probably extremely likely to be subject to explosions even though the coal produced is low-volatile.

It would seem that low-volatile mines should be protected by as large a percentage of inert dust as mines which have high-volatile coal, for the tests by which the correct quantities of inert dust are determined are made, not with natural dusts, but with dusts which, in some instances, are unnaturally fine and, in other instances, are merely typical of what may be expected in all portions of the mine.

### Firedamp's Two Explosive Gases

Firedamp is methane mixed with air and air is oxygen mixed with nitrogen. Methane will not burn without oxygen, that is, oxygen will not burn without methane. We commonly say methane burns and oxygen supports combustion, but we might just as well reverse the statement and make oxygen burn and methane support its combustion, though by saying so the proprieties would be shocked. So there are two explosive gases in firedamp—methane and oxygen—and no explosion can take place unless there is enough of both to make enough heat in their combustion to keep the explosion or combustion under way.

Too much nitrogen will cool the gases down so much that when they try to explode, they can't succeed in doing so. Nitrogen and carbon dioxide act as does the gauze in a lamp. It cools off the two explosive gases that are trying to start something. Hence two gases are needed for an explosion, and they must be in a certain range of values that will produce an explosion. There can be too much oxygen for the methane to explode and too much methane for the oxygen to explode. The chemists say there are two limits for methane, a lower limit where there is just enough methane (5 percent) for the methane to explode and an upper limit (15 percent) where there is so much methane that an explosion is impossible. In the latter case, an explosion can occur only by the entry of more oxygen or air.

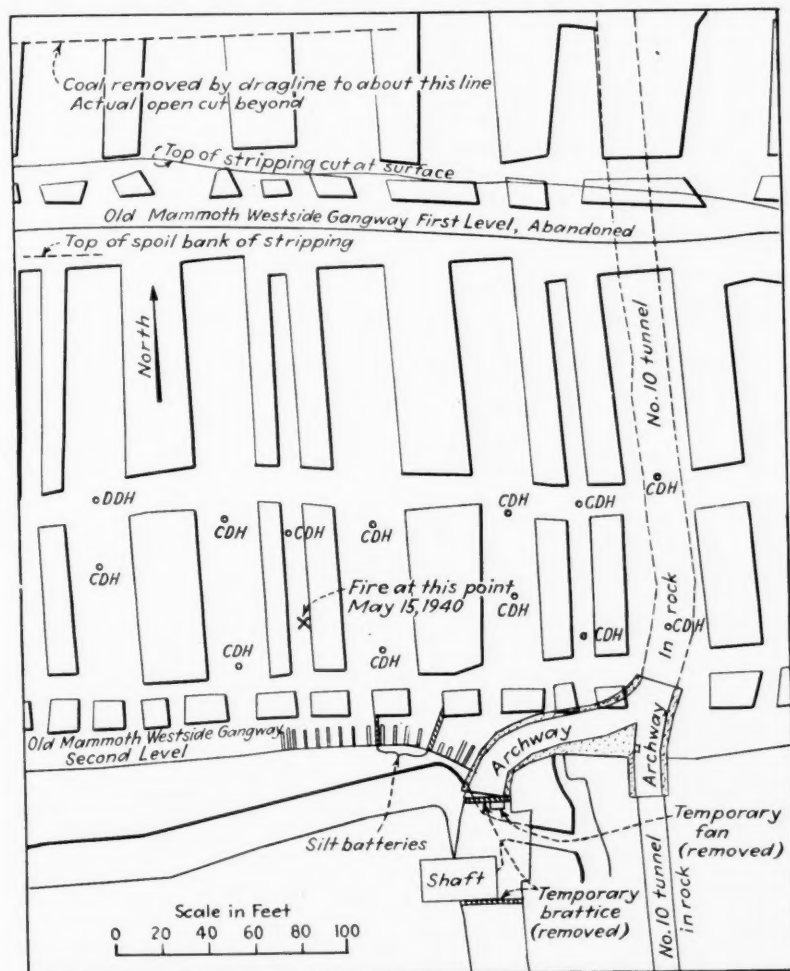


Fig. 2—Plan of Mammoth bed at Continental shaft showing churn-drill holes (CDH) and diamond drillhole (DDH), drilled to the coal seam from surface, also archway erected to cut off fire.

# STATE-BOARD QUESTIONS

## Questions, Second Grade Mine Foremen's Quiz Bituminous Region, Pennsylvania, 1942\*

Q.—In an airway having a cross-section of 73.125 sq. ft., how many cubic feet of air is passing per minute if the velocity of the air is 40 ft. per second?

A.—175,500 cu.ft. per minute. (Quantity = cross-section of airway  $\times$  velocity per second  $\times$  60 seconds =  $73.125 \times 40 \times 60 = 175,500$ .) 4 points.

Q.—You have the following known facts: Area, 60 sq. ft.; velocity, 1,000 ft. per minute; w.g., 2 in. Substitute these figures in the formula:

$$H. P. = \frac{q \times W. G. \times 5.2}{\text{units of work per hp.}}$$

$$A.—H. P. = \frac{60,000 \times 2 \times 5.92}{33,000}$$

18.91. 5 points.

Q.—What gases are found in the vicinity of mine fires?

A.—Carbon dioxide and carbon monoxide. 3 points.

Q.—Of what two gases is normal air composed?

A.—Oxygen and nitrogen. 3 points.

Q.—Calculate the weight of 100 cu.ft. of normal mine air at 30 in. of barometer and 58 deg. temperature F.

$$A.—\frac{1.327 \times 30}{460 \times 58} \times 100 = 7.685 \text{ lb.}$$

5 points.

Q.—Which is heavier, 2 cu.ft. of air or 1 cu.ft. of carbon dioxide at normal temperature and pressure?

A.—Two cu.ft. of air. (Carbon dioxide is one half heavier than air). 2 points.

Q.—Is carbon dioxide a poisonous or non-poisonous gas?

A.—Non-poisonous. 2 points.

Q.—In a still atmosphere, is carbon dioxide found near the top or near the floor?

A.—Near the floor. 2 points.

Q.—What is the specific gravity of carbon dioxide?

A.—1.53. 2 points.

Q.—Is carbon dioxide a product of complete or incomplete combustion?

A.—Complete combustion. 3 points.

\*Continued from September, 1942, *Coal Age*, p. 66.

Q.—Name the inert gas found in the air.

A.—Nitrogen. 1 point.

Q.—What percentage of inert gas is in normal air?

A.—About 79.5 percent. 2 points.

Q.—Which is heavier: 3 lb. of air or 3 lb. of carbon dioxide?

A.—They are of equal weight. 1 point.

Q.—What is a miner's first duty when he enters his place at the beginning of the shift?

A.—Examine roof. (Art. XXV, Special Rules, Rule 1 says: "Miner shall examine his place before beginning work and take down all dangerous slate or otherwise make it safe by properly timbering it before commencing to mine or load coal." Strictly speaking, the law does not say what he shall do first, examine for gas or for bad roof.) 4 points.

Q.—Who is permitted to ride on loaded trips?

A.—Only the driver, trip rider, or snapper (Art. XXV, General Rules, Rule 10). 2 points.

Q.—Who is permitted to ride on locomotives?

A.—Motorman and his assistant (Art. XXV, Special Rules, Rule 55). 1 point.

Q.—What is the maximum speed of a man trip?

A.—Six miles per hour (Art. XXV, Special Rules, Rule 3). 1 point.

Q.—What is the maximum speed of other trips hauled by locomotives?

A.—No maximum speed fixed by law, but designated by mine foreman (Art. XXV, Special Rules, Rule 5). 1 point.

Q.—Who must see that headlights are kept burning on locomotives?

A.—Motorman (Art. XXV, Special Rules, Rule 5). 1 point.

Q.—How can you conduct air from the last crosscut to the face of a room or heading?

A.—By a check and line brattice. 4 points.

## Quiz Presented Applicants for Certificate As Mine Foremen in State of Alabama\*

### Some Alabama Laws

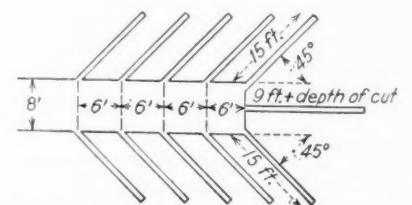
Q.—What are the requirements as to: (a) shutting down operation of mine by inspectors; (b) application of operator to circuit court for injunction against such stoppage of operations; (c) accumulation of explosive gas and the fencing of abandoned mines and (d) precautions to be taken when presence of water or gas makes place dangerous?

A.—The chief mine inspector or an associate mine inspector can stop immediately the operation of any coal mine or any part of it if the quantity of methane or flammable coal dust in it is such as, in his or their opinion, may endanger the lives of persons working in it. Only men who have been officially designated to correct such condition and are properly protected shall remain in or enter such place (Sec. 1617, Amendment of July 17, 1935).

(b) Any operator thus stopped may

apply to the circuit court, and, upon 10 days' notice served on the chief mine inspector, the application for injunction shall be heard by that circuit judge. If upon hearing it is shown that the mine or the part of it is wrongfully closed, the circuit judge shall award a writ of injunction in favor of the operator restraining the chief mine inspector and associates from stopping the operation (Sec. 1618, Amendment of July 17, 1935).

(c) No accumulation of explosive gas shall be permitted in any work-out or



Feeling for water. Holes drilled to find water must not be used for blasting.

\*Continued from August, 1942, *Coal Age*, p. 70.



abandoned parts of any coal mine in operation and the entrance or entrances to such worked-out places shall be fenced properly with cautionary notices to warn persons of danger (Sec. 1656).

(d) When a place is known to be likely to "obtain" [contain] a dangerous accumulation of gases or water, workings approaching such a place shall not be driven more than 8 ft. wide and those driving such place shall keep constantly

one borehole near the center of the working not less than 3 yd. in advance of the working face and one in each corner 5 yd. deep at an angle of 45 deg., sinking these at 6-ft. intervals. These holes shall not be used for blasting, but other holes, not over 4 ft. deep, shall be drilled for that purpose. These precautions must begin at least 100 ft. from the probable source of danger (Sec. 1688). See illustration.

answer, and also demands that all detonators or electric squibs shall be carried into the mine in non-conductive wood, fiber or other approved receptacles with approved tops.]

#### Protection of Goafs

Q.—What shall be done with accumulations of methane in worked-out or abandoned portions of a mine?

A.—They shall be safeguarded by danger signs ..... (X)

They shall be removed as soon as possible ..... (X)

Care shall be taken to keep them moving into return ..... ( )

They shall be inspected and analyzed weekly ..... ( )

[Sec. 40, in regard to the mine foreman, provides that "any accumulations of explosive or noxious gases in the worked-out and abandoned portions of any mine shall be removed as soon as possible after their discovery. . . . The foreman shall direct and see that all dangerous places and the entrance or entrances to worked-out or abandoned places in all mines are properly fenced off across the openings, so that no person can enter and that danger signals are posted upon said fencing to warn persons of existing danger." Sec. 36, in regard to firebosses, says the same in almost identical words.]

## Queries Posed Candidates for First Class Mine Foremen Certificates in Kentucky\*

### Cage Safety Devices

Q.—What safety devices are required to be provided on every cage used for lowering or raising persons?

A.—Adequate brake ..... (X)

A telephone or other approved method of communication ..... ( )

An approved safety catch and a sufficient cover ..... (X)

A permissible flame safety lamp. . . . ( )

[Sec. 21 requires that the devices checked above and some others be provided. Metal tubes, pipes or telephones "through which conversations may be freely held between persons at the bottom and top landings" are ordered, but nothing is said as to telephone connection with the cage.]

### Notifications of Accident

Q.—Who shall be notified of a death from explosion or accident?

A.—Sheriff ..... ( )

Governor ..... ( )

Department of Mines and district inspector ..... (X)

Circuit judge ..... ( )

[Sec. 27 requires the superintendent of the mine or, in his absence, the mine foreman in charge of the mine, to give notice forthwith of any loss of life or serious personal injury, due to any fire, explosion or other accident in any coal mine or to the machinery connected therewith, to the inspector of the district, stating the particulars of such accident, and, if anyone is killed thereby, to the Department of Mines and Minerals.]

### Ventilation Records

Q.—How shall the mine foreman keep the records of ventilation?

A.—On the mine map ..... ( )

On the payroll sheet ..... ( )

In a book ..... (X)

On a bulletin board ..... ( )

[Sec. 40 requires the mine foreman or his assistants, with ink or indelible pencil, to make a record, in the book provided for that purpose, of the condition of all places where danger has been found. Later, in the

same section, the mine foreman is specifically stated as the person to make the record of what he has found or of what his assistants have reported to him.]

### Explosives and Caps

Q.—In mines how far apart should explosives and caps be kept?

A.—No nearer than 6 ft. from each other ..... ( )

No nearer than 12 ft. from each other ..... (X)

In separate compartments of same receptacle ..... ( )

In an inclosed non-conducting box ( )

[Sec. 41 requires, as stated in the second

## Queries Posed Candidates for First Class Mine Foremen in Virginia\*

Examinee should put an X in the ( ) after what he believes to be the correct answer and check only one of the four answers.

Who is authorized to see that the mine is kept in sanitary condition?

Mine management ..... (X)

State Board of Health ..... ( )

U. S. Bureau of Mines ..... ( )

Local Health Department ..... ( )

Types of fans in use today are:

Exhaust, force and booster. . . . ( )

Gasoline, electric and steam. . . . ( )

Centrifugal, disk and propeller. . . (X)

Jeffrey, Robinson and Stine. . . . ( )

[Exhaust, force and booster fans are not different types of fans but fans classified by the work which they are performing. Similarly, gasoline, electric and steam fans are fans designated by the nature of the power by which they are driven and not by the character of the fans themselves. Jeffrey, Robinson and Stine are names of manufacturers. The Jeffrey Manufacturing Co. lately has turned mostly to propeller-fan manufacture, as a result of the popularity of this type with the mining industry. Stine fans may be disk fans or centrifugals. Robinson

makes backward and forward centrifugals. The real distinction of type is "centrifugal, disk and propeller."]

The purpose of mine ventilation is:

To increase the efficiency of the workmen ..... ( )

To humidify the mine atmosphere and preserve equipment ( )

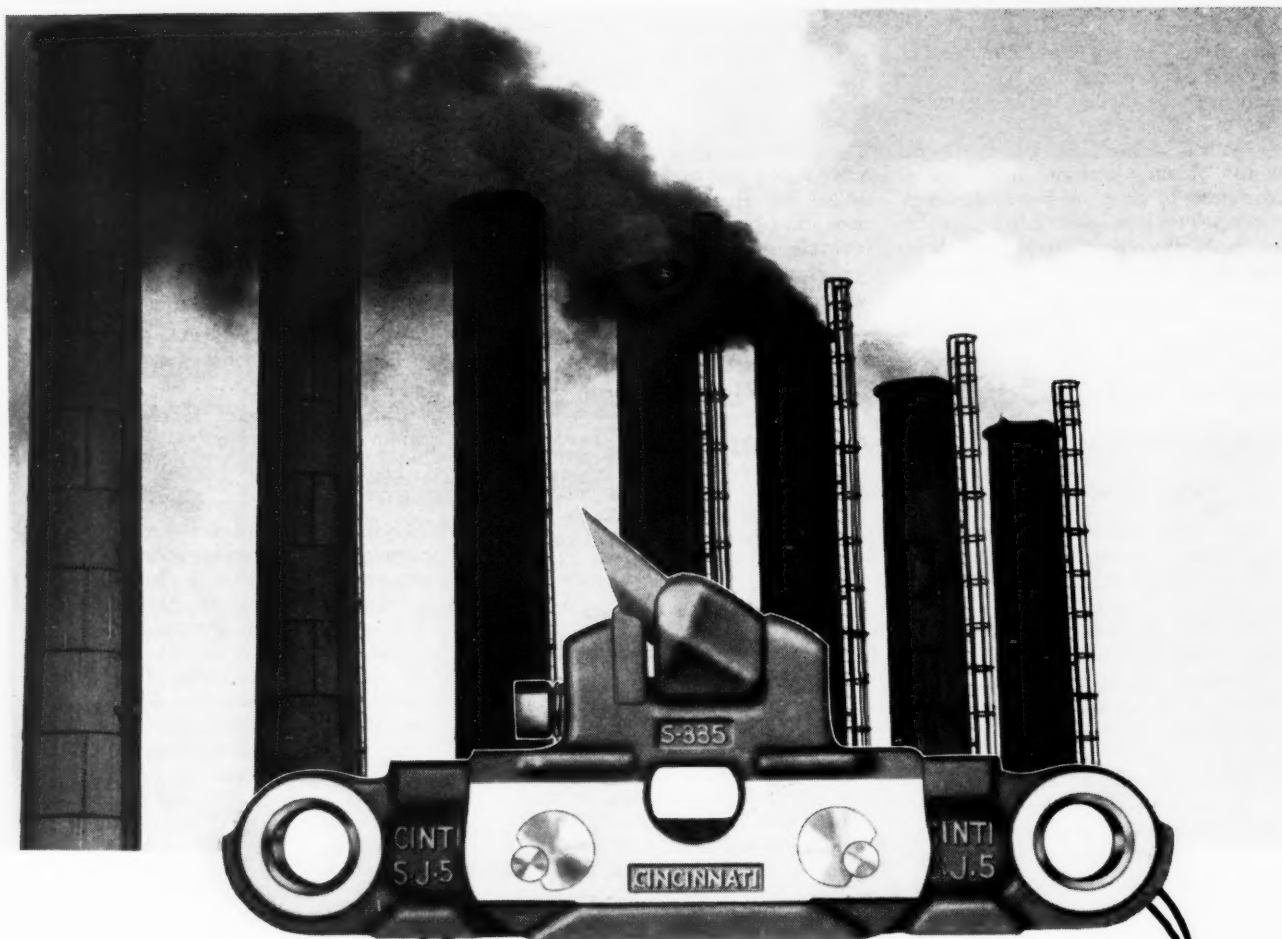
To protect the health and life of the workmen ..... ( )

To dilute the noxious gases and produce a water gage. . . . . (X)

[Mine ventilation will increase the efficiency of the workmen. It may or may not humidify the mine atmosphere. If it dries the air as in a deep warm mine, it will lengthen the life of timber and preserve equipment. Humidification destroys equipment and causes the growth of fungus. Ventilation protects the health of the workman and, by giving better visibility, protects his life and limbs. It also protects him against suffocation and the toxic effects of the nitrogen oxides and the sulphurous gases generated by shots. The main purpose of ventilation is to dilute noxious gases. Ventilation does not produce a water gage, but a difference in water gage produces ventilation and so the fan or furnace is used to produce that water gage.]

\* Continued from September, 1942, *Coal Age*, p. 67.

\* Continued from June, 1942, *Coal Age*, p. 80.



Easily replaced, hardened alloy steel Connector Insert gives fresh from the factory joint accuracy to worn connector.



Hardened Eccentric Pin puts joint wear between pin and insert... doesn't turn in block. With replacement of pin and insert the joint is like new.



Alloy steel, heat treated Rivet holds bearing pin against longitudinal displacement. Easily removed.

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# TIMELY OPERATING IDEAS



## Welding Cutter-Bar Support Sure Fire With Jig

For welding machine parts on which accurate alignments are required, jigs are a necessity from the standpoints of getting the alignment, control of heat warping and reducing labor cost. A jig for an Oldroyd cutting machine part, photographed recently in the welding department of the general shop of the Hanna Coal Co., Piney Fork, Ohio, is shown in the accompanying illustration.

Users of Oldroyd cutting and shearing machines will recognize that the part in the jig is an upper support for the cutter bar. The unit itself bears the chalked letters A, B and C. Base D of the jig consists of two 3½x6-in. I-beams on 10½-in. centers, with a ¾-in. plate welded on top and with axles mounting 3-in. steel wheels at the extreme ends of the channels. E is a hollow pedestal cast for the purpose and having a machined shoulder at the top to position Ring B of the cutter-bar support.

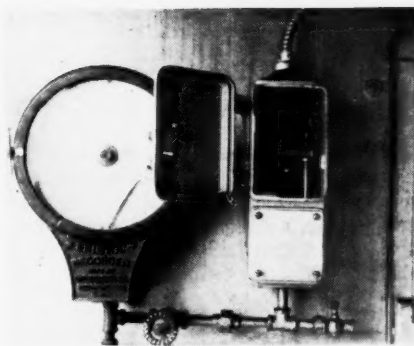
If this part B has been broken off the balance of the support and is to be re-attached by welding it is clamped by the Crossbar F, which is raised to the top of the vertical bolt. The other bolt, lying beside the first, is put down through a hole in F, through the hollow center of E, through a hole in the bottom plate, and the nuts are pulled up tightly. To prevent warping, it is necessary to leave the work clamped in the jig until it is cool.

To align the cutter-bar lock, which is the part at the upper right hand, the ring and bar assembly in the foreground is placed on top of B and a pin inserted through the bar hole matching those in the cutter-bar lock. To strengthen the main body of the support, fillet plates, as indicated by the triangular weld adjacent to the letter A, are added, one on each side.

## Air-Operated Relay and Horn Make Mine-Ventilation Alarm

Ventilation is a vital factor in mining. Various schemes have been worked out to assure this air supply or to make known its failure. At the Bankston Creek Mine No. 5 of the Sahara Coal Co., Harrisburg, Ill., a 220-volt horn is sounded. An air-operated relay normally holds the alarm circuit open. Should the fan stop from power failure, or the pressure fall for other reasons, the relay closes the alarm circuit, warning all within hearing distance.

This air-operated relay was made from the working parts of a discarded Bristol recording air-pressure gage. The bellows, mounted on a supporting base, are connected to the pressure (downcast) side of the fan by a tube. Four bolts extend upward from the base and support an insulating board on which two brass contacts are mounted. These contacts are connected into the alarm circuit with a gap between. A threaded stem, secured vertically to the top (free end) of the



Air-operated relay.



Fan installation.

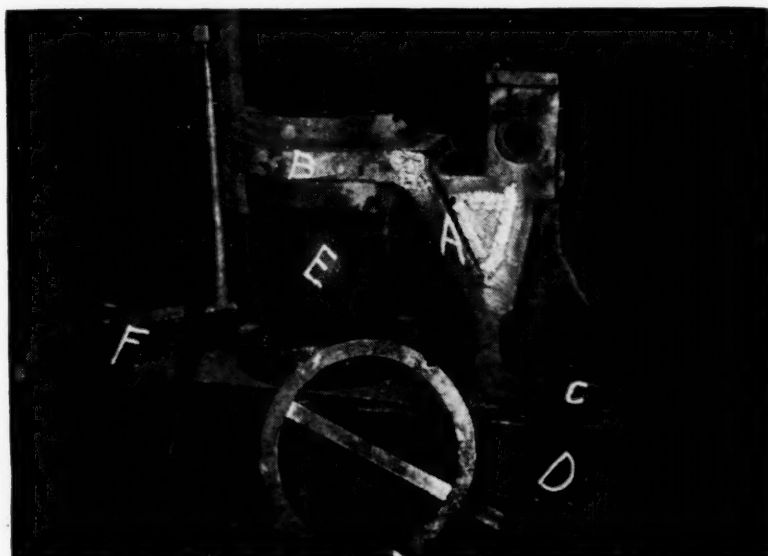
bellows, extends through a hole in the insulating board and carries a loose washer which bridges the gap in the alarm circuit when air pressure drops.

The complete relay is mounted in a cast-iron box with a hinged door. This affords access for any needed adjustments. The electrical department at Sahara Coal Co. devised this alarm.

## Spring Tension Steadies Heavy Cables

Three 1,000,000 cir.mil single-conductor insulated cables suspended between the power plant and steel tippie at Mine No. 1, Bell & Zoller Coal & Mining Co., Ziegler, Ill., vibrated violently during the hoisting cycle. Ernest Prudent, chief electrician, devised a simple and effective cure for that vibration.

An Ohio Brass No. 15344 insulated feeder strain clamp assembly was clamped to a bared section of each cable. The free ends of the three assemblies were anchored to the tippie structure through the medium of a spiral spring attached to each. A loose bolt is fitted in parallel



Newest jig in the Piney Fork welding shop.





Fig. 1—Strain assembly and spiral springs taking the strain of 1,000,000-cir.mil cables.

with each spring to take the strain of the cable in the event a spring should break.

The clamp assembly consists of a 5-bolt clamp of correct size for the bare cable in series with two porcelain strain insulators and, finally, a closed eye for attaching to the anchor structure. The clamp part of the assembly is offset, so the cable can

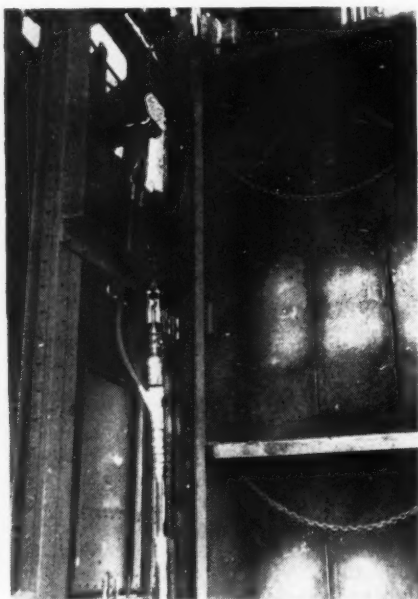


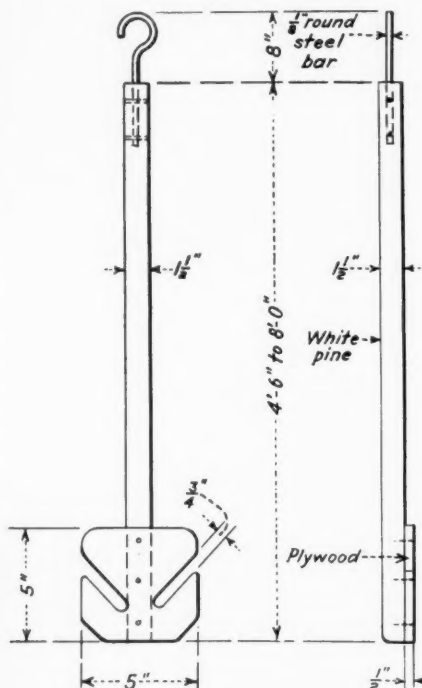
Fig. 2—Shaft cables hung on strain assemblies.

continue on by in whatever direction necessary. The clamp and one strain insulator is taped to keep water out of the conductor where it was bared. The same type of assembly is used to suspend the cables in the shaft.

### Portable Cables Protected By Temporary Hangers

Temporary hangers developed in a coal-mine car shop to prevent damage to and conserve portable electric cords and hoses are shown in the accompanying illustration, submitted by K. N. Bantlin, mining engineer, Louisville, Ky. "After a recent address by the chief engineer urging on employees the necessity of conserving rubber goods," Mr. Bantlin relates, "the car shop checked into the cause of damage

to its portable electric cords and air hoses." This study revealed that the majority of the damage was caused by dragging the cords on the floor, accidental dropping of timber, metal or tools and cutting the cords with car wheels.



Construction of temporary hanger for cords and hoses.

"To prevent this type of damage, it was decided to devise some method of keeping cords and hoses overhead. The inexpensive hanger illustrated was the result. It is constructed of wood except for the top hook, which is made of welding rod and can be bent readily to hook over pipes or the steel work overhead."

### Loading Boom Hoist Made From Junk-Yard Parts

Prior to this emergency, the building in a local shop of an item of equipment which could be secured from a manufacturer's stock usually represented an attempt to save cash outlay or to charge

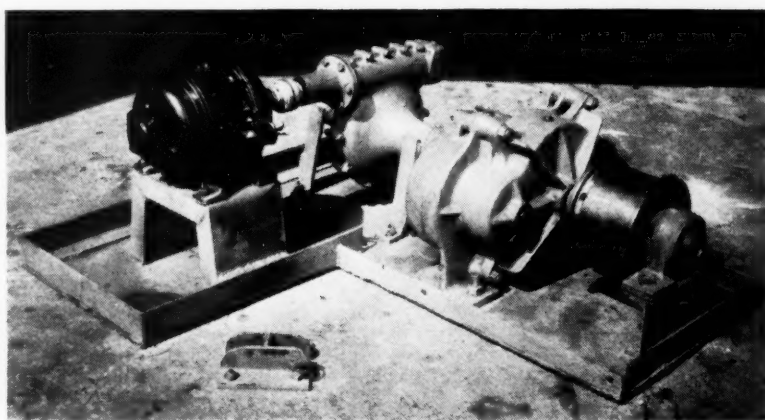
## Little Ones

Big things often depend upon little ones. The failure of one link, for example, may shut down a \$13,000 loading machine for hours. So little things are well worth careful attention. How little things—and many big ones—may be handled quickly and efficiently is the theme of this Operating Ideas department. Operating, electrical, mechanical and safety men are invited to study it and are urged to make contributions to it. So if you have an idea which has helped you out or helped things along, send it in, with a sketch or photo if it will help to make it clearer. For each acceptable idea, Coal Age pays \$5 or more on publication.

the cost to operation rather than requisitioning through regular channels and thus adding to capital account. Now the building or assembling of equipment locally is likely to mean that it could not be secured, would require many months to get delivery or was done to conserve materials.

When a hoist was needed recently for an egg loading boom at the Anthracite mine of the Tennessee Jellico Coal Co., the unit shown in the accompanying illustration was designed by the engineering department of the Block Coal & Coke Co., an affiliated interest, of which M. M. Haley is chief engineer. All parts and materials, excepting motor, coupling and a reversing controller, pushbutton operated, were secured from local junk yards. The worm reducer is a Ford differential, the spur-type reduction gearing, ratio 40 to 1, is from a chain hoist and the drum with integral shaft was turned from a section of an old large-diameter journal shaft.

Use of the Ford worm-type back end introduces enough friction that the hoist drum will not be rotated by the loading boom weight when power is off the motor. In other words, the boom will stay put. Speed of the motor is 1,800 r.p.m. and that of the rope drum 6 r.p.m.



The worm is a Ford rear end now retired to an easier job.



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We can't afford a speck of waste, and even the toughest equipment will last longer when cared for properly.

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#### MAKING BATTERIES LAST HELPS STOP THE AXIS!

- 1 Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
- 2 Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
- 3 Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.

- 4 Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

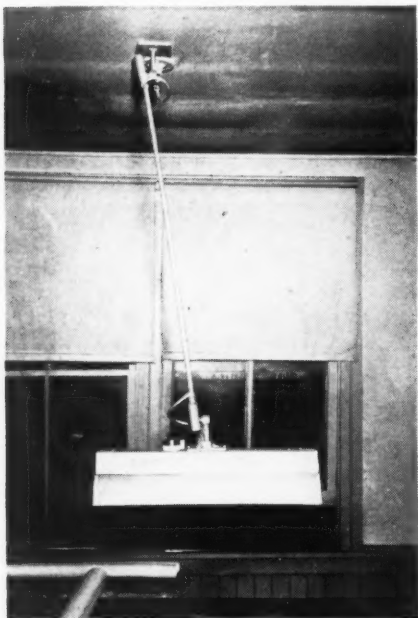
If you wish more detailed information, or have a special battery problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.

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## Fluorescent Lamp Mounting Uses Model T Parts

The accompanying illustration of the mounting of a drafting room fluorescent lamp adds another to the long list of uses to which Ford Model T parts have been put at coal mines. Not likely is there another such fluorescent lamp mounting in use by a coal mining company. This one is in the local engineering office of the Blue Diamond Coal Co., Westbourne, Tenn., which office, under D. Sanders, superintendent, handles the engineering



Steering tierod and knuckle joints allow adjustment of lamp over table.

and management for Westbourne and Eagan mines.

When J. M. Gray, engineer, wanted to install a new 60-watt fluorescent lamp over the mine-map drafting board he saw a need for adjusting the lamp position for close work over various parts of the table. For the purpose he hit on the use of a steering tierod and the knuckle joints from a discarded Model T. By gas welding in the mine shop this discarded part was quickly rebuilt with suitable brackets and with a tube of the right length in which the electric cord is carried.

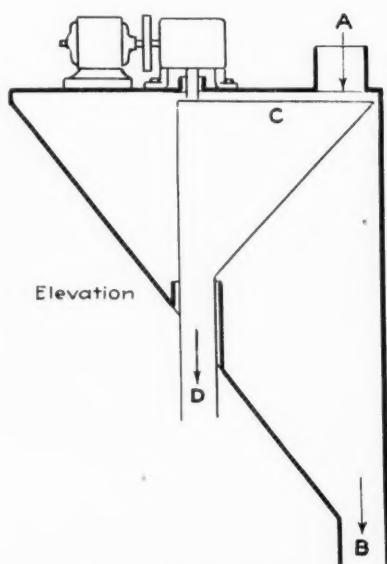
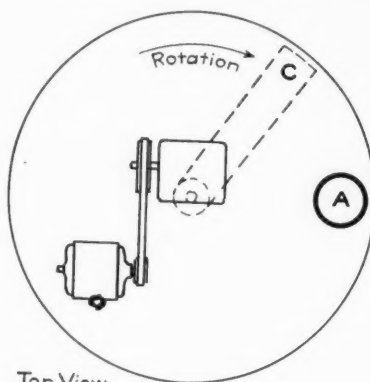
## Continuous One-Way Motion In Sampling Fine Coal

For taking increments of a stream of fine coal dry enough to flow freely through a pipe or chute, the accompanying sketch shows an automatic sampler adapted from a unit in use at a Tennessee metal mine where fine crushed ore is sampled continuously. In that metal mine service the sampler is not inclosed to prevent escape of dust. The sketch includes an inclosure to confine coal dust.

The coal stream from Pipe or Chute A drops freely through the inclosure and runs out through Pipe or Chute B. Wing Box C, which has an open top, rotates at constant speed, thus cutting

through the coal stream once each revolution while the sample increment collected flows down through Rotating Pipe D. The wing box, C, is welded to Pipe D. This latter pipe has its side cut away to connect with the wing box.

The quantity of sample collected de-



Rotating Wing C cuts the coal stream.



Wing-box sampler cutting a stream of fine crushed ore.

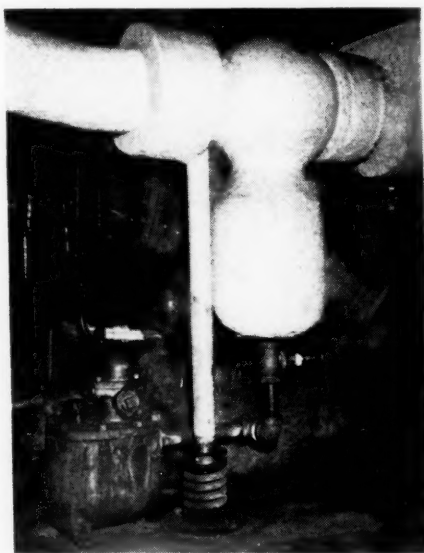
pends on the width of opening in the top of the wing box and speed of rotation. The sketch indicates single V-belt pulleys connecting the fractional-horsepower motor and worm-gear reducer. However, a pair of 4-step cone pulleys would provide a convenient means of changing speeds. The slow speed of 1 r.p.m. or less allows use of simple bearings on the rotating wing or pipe. If made of light material, the weight of the wing and pipe may be taken by the thrust bearing in the worm reducer.

The inclosure is in the shape of a large vertical pipe sliced off by a plane at a steep angle, except that the bottom corner connects with Pipe B. One of the advantages of this type of sampler is the absence of controls and relays because no intermittent timing or reversing are necessary.

## Adjustable Spring Supports Added to Turbine Lines

Support of weight without rigidity which would put undue strain on the high-pressure steam lines feeding the turbines in the power plant of the Koppers Coal Division of Eastern Gas & Fuel Associates, Weeksbury, Ky., was accomplished by building and installing at each turbine an adjustable spring post. These supports in no way affect the benefits of the extension loops of the steam lines, which come up through the engine room floor from a basement header. The pressure and superheat temperature are 175 lb. and 100 deg. F.

The post of 2½-in. pipe is attached at the top to a saddle supporting the line

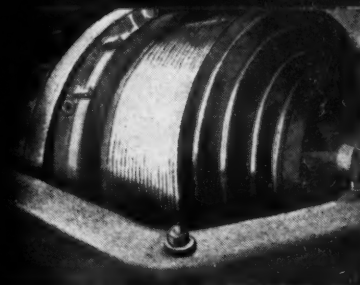


Steam line support at turbine.

and at the bottom slides freely in a flanged baseplate. Resting on the plate and surrounding the 2½-in. pipe is a coil spring topped by a round nut or collar screwed onto the pipe. Adjustment of this collar was made with the joint between steam line and turbine loose, turning the nut until the spring was compressed the right amount to take the steam line weight and properly align the joint ready for rebolting. The collar is locked by setscrews.



# TIPS FROM MANUFACTURERS



## Reduction Valves

A new method of speed reduction, introduced by the American Pulley Co., Philadelphia, comprises two main elements: The helical-gear reduction unit itself mounts directly on the shaft of the driven machine; a standard belt drive operates between the motor and the input shaft of the reduction unit.

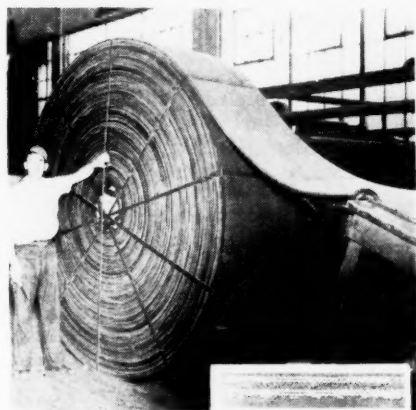
Six reduction units, each with 13:1 ratio, cover all applications from  $\frac{1}{2}$  to 25 hp. Consequently, says the manufacturer, by selecting appropriate stock-size pulleys—flat-belt or V-belt—an American reduction drive can operate any slow-speed machine with speeds from 154 down to 11 r.p.m. without factory conversion or rebuilding. Since this unit mounts directly on the shaft, no space or expense for special foundation is required. The gears are completely protected from shock loads by the shock-absorbing action of the primary belt drive.

## Steel-Carcass Conveyor Belt

A new type of conveyor belt which uses steel cables in place of the customary cords or fabric is offered by the Goodyear Tire & Rubber Co., Akron, Ohio. Described as an epochal advance, one of the steel-carcass conveyor belts is in use already at the Oliver Iron Mining Co., Duluth, Minn., being used at the mine to lift ore 240 ft. in an 1,100-ft. conveyor.

The belt completes the lifting task in one continuous operation, obviating the one, two or three transfers from individual belts which would have been necessary with the old type of conventional cotton-fabric or cotton-cord construction. Although no thicker than a conveyor belt with, for example, six plies of fabric, the new belt's strength is said to be actually the equivalent of 14 such plies.

Goodyear engineers maintain that the



steel cables in conveyor belts permit a maximum of troughing. This means a deeper depression, or valley, in the center of the belt, without injury to the belt itself, in order that heavier loads can be carried on the belt without spilling over the sides. The carcass of each steel-cable belt consists of parallel steel cables, each cable containing a multiplicity of closely laid thin strands.

## Interceptor Phone System

Executone, Inc., New York City, offers an improved executive-monitor communication system consisting of two or more master stations connecting up to 19 remote stations in the system. The executive and monitor stations can talk to each other, or either can carry on two-way amplified

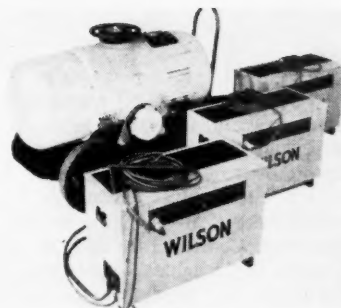


voice conversations with remote desk or trumpet-type substations in outlying departments. The interceptor-control feature enables the assistant at the monitor station to intercept all incoming calls originating at the remote stations.

## Arc Control Stations

Greater welding output per machine, better control by the operator and improved welds on thin-gage metal are said to be obtainable through the use of the Honey Bee arc control station developed by Wilson Welder & Metals Co., New York City. Made in capacities of 75 and 150 amp., these stations are an auxiliary electric device, connected in series with the welding circuit of any constant-potential arc-welding generator.

Most conventional dropping voltage generators can be converted quickly and easily to constant potential. For this purpose, Wilson supplies a quick change switch mounted on the generator. A portable switch held in the operator's hand gives the operator remote control of the welding current within predetermined



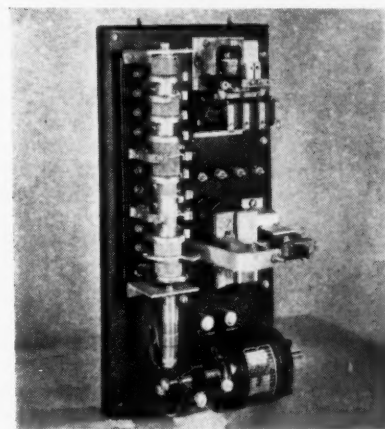
limits. This switch may be combined with the electrode holder, if desired.

When two or more arc control stations are hooked up to a single generator, a like number of welding arcs can be operated simultaneously. Each operator can regulate his own current and weld as he sees fit without affecting the other in any way.

## Synchromatic Relay: Reflector

A new STA synchromatic relay for field application that makes possible more satisfactory synchronous motor starting is announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

The relay consists of two elements, one that is speed responsive, and the other time responsive. The speed-responsive element is a current relay and the time responsive element is a rotary drum switch. Both elements are said to be simple in design, rugged and trouble-free in con-



struction and need no critical adjustments.

The synchromatic relay meets basic requirements for synchronous motor control and is compactly designed either for panel mounting or modern dead-front metal-enclosed swing-door-type control structure.



For general lighting of medium and low bay areas in industrial locations, a new porcelain enameled high bay reflector line also is offered by Westinghouse. Designed for either incandescent or high-intensity mercury lamps, the new line is available with either the lockite two-piece quick detachable construction or one-piece type for conduit or outlet box mounting. The multiple-coat porcelain-enameled reflecting surface is said to be permanent, easily cleaned and to have a reflectivity of 80 percent.

### Intercommunicating System

Talk-A-Phone Mfg. Co., Chicago, offers a new intercommunicating unit, known as the KS-60 super selective model, made up exclusively of master stations and permitting a number of two-way conversations to be held simultaneously without crosstalk. Masters can call one another regardless of whether station being called has power "on" or not. Systems may be built up progressively, beginning with two master stations to any number of stations desired.

A feature of the unit is optional privacy earphone. When earphone is used, "Talk-Listen" switch does not have to be operated, and the unit works exactly the same as a telephone. Volume for earphone may be adjusted. Bulletin, "Talk-A-Phone Systems," may be had from the company.

### Ready With Reclaim War Tire

Goodyear Tire & Rubber Co., Akron, Ohio, is making ready to go into quantity production of its new war tire. The new tire, which will give 10,000 miles if driven at speeds of 35 miles per hour and less, contains only 4 oz. of crude rubber. Aside from the crude used in cementing the plies, it is a reclaim tire whose materials have come from the nation's rubber scrap pile.

In the expectation that government regulations in line with the Baruch committee report will soon release sufficient quantities of the reclaim to keep essential wheels rolling, the company has tire-building machines, molds and ample supplies of reclaim on hand.

The new war tire is said to be husky and sleek, with tread design and its entire appearance such that it cannot be told from a first-quality tire of the pre-war days. It lends itself to recapping

when the original tread becomes worn. Attached to each tire will be a tag which informs the purchaser that the tire is made from reclaim and that speeds in excess of 35 miles per hour must be avoided.

### Varnish for Hot Spots

Sterling Varnish Co., Haysville, Pa., has developed a new insulating varnish, designated as S-110, for application to electrical apparatus that must operate at abnormally high temperatures. Tests are said to have indicated that S-110 will stand operating temperatures at 250 deg. C. or higher.

When baked at 175-200 deg. it dries all the way through the deepest winding and does not resoften when exposed to high operating temperatures. The dried film is mechanically strong, exceptionally adhesive and flexible, and retains these characteristics under adverse heat conditions.

### Lightweight Dust Respirator

Willson Products, Inc., Reading, Pa., has brought out the new Willson No. 10 respirator, said to be one of the lightest-weight respirators ever to receive U. S. Bureau of Mines approval. It is designed to combine the advantages and extra comfort of extremely light weight with

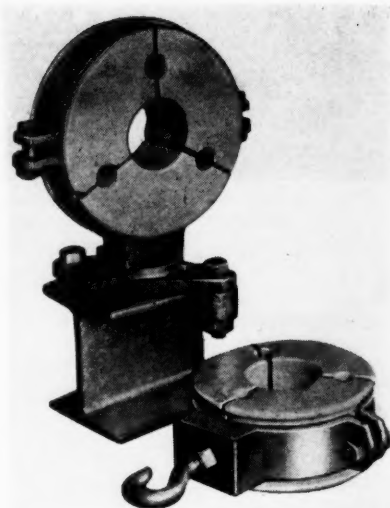


dependable protection against harmful dusts.

Breathing freedom is provided through specially designed inhalation and exhalation valves. Elastic headbands hold the respirator comfortably in place; facepiece is easily adjusted to fit the contour of the wearer's face. The design is extremely simplified, having few replacement parts to get out of order.

### Open Wiring Support

The war emphasizes need for construction methods which save time, material and manpower, so open wiring is now more extensively used. Apropos of which Delta-Star Electric Co., Chicago, points out that recent interim amendments to the 1940 National Electrical Code permit



multiple circuits and the use of these supports up to 600 volts. Their employment is said to result in copper savings in excess of 50 percent with equal or better voltage regulation and lower construction costs.

### A.C. Welding Electrode

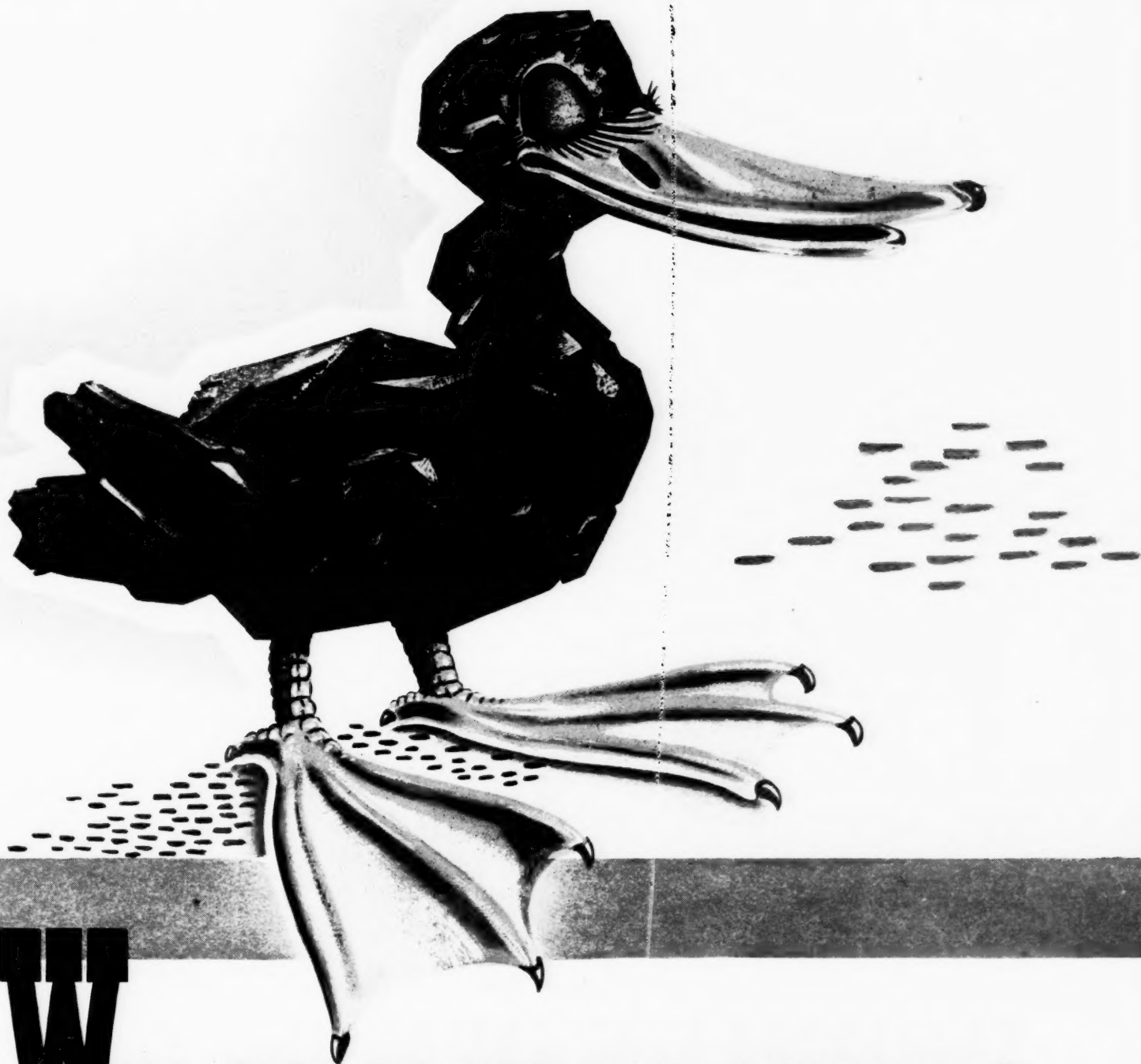
A new electrode designed specifically for all-position welding of mild steel with a.c. type welding machines has been developed by Air Reduction Sales Co., New York City, in  $\frac{1}{8}$ - and  $\frac{3}{16}$ -in. diameters. Physical tests, it is said, demonstrate that the Airco No. 230 gives satisfactory results and that average operators have no difficulty in obtaining good fusion and complete penetration. The finished weld deposit is stated to be quite smooth and has a uniform surface contour.

### Small Wire Terminal

A small wire terminal, the Hylug, has been developed for standard, aircraft and navy cable by the Burndy Engineering Co., Inc., New York City. Three sizes take from No. 22 through No. 10 strand. Featuring exceptional compactness and lightness of weight, Hylug is available in many variations—with a sight-hole for inspection with a closed back for moisture-proof sealing; with or without an insulation shroud; and in many different tongue shapes and dimensions.

Installation is said to be simply and rapidly accomplished by means of the Hy-tool, specially designed pliers, or by pneumatic Hypresses. Either tool indents the lug on the cable to the proper depth, resulting in a secure, highly efficient connection. For insulating sleeves for Hylugs, Versiflex tubing, a Burndy thermoplastic material, is recommended. The high elasticity of Versiflex adds to the





# WILL COAL BE THE UGLY DUCKLING?

In tens of thousands of homes, coal is being given a new trial — a trial brought on by emergency restrictions of other fuels. Probably never again will coal have the chance to prove itself under such favorable conditions — customers literally dropped into its lap and no pressure from competition. ¶ Coal can come through this war-time boom in a stronger position than ever. Or, it can be dropped like a worn-out tool as soon as the peace is

signed. How coal deports itself now — when consumers have little choice — will determine the industry's fate when fuel is again a matter of preference. ¶ Make sure that every ton of domestic coal is dustproofed with clean, effective and harmless calcium chloride. And today, after you have bought your War Savings Bonds, write for new bulletin No. 37. The Calcium Chloride Association, 4145 Penobscot Building, Detroit, Michigan.



case and speed with which it can be slid over the connection, while its high dielectric strength insures safe insulation. Versi-flex tubing can be marked as desired.

### Turret Lathe

A new floor-type turret lathe is offered by the South Bend Lathe Works, South Bend, Ind. It is designed for the rapid production to close tolerances of small chucking or bar work. Second operation work also can be handled efficiently. This lathe has a 10-in. swing over the bed or saddle wings, 1½-in. hole through the headstock spindle, and 1-in. collet capacity.

### Lubricator

A new portable forced-induction pump, "50" series, is the latest addition to the line of "Pile Drivers" manufactured by the Lincoln Engineering Co., St. Louis, Mo. With this unit, it is said, materials such as sealing compounds, sound deadeners, insulating materials, putty, viscous grease, heavy lubricants, etc., which heretofore have been considered impossible to handle except by time-consuming laborious hand methods, can now be pumped directly from original container to the point of application. This is made possible through forced-induction priming.

A worthy junior edition of the stationary installation-type Lincoln "Pile Drivers" of the "100" and "400" series, this portable model has the advantage of being designed for use where it is necessary to move the unit from one location to another.

### Flexible Wire-Rope Slings

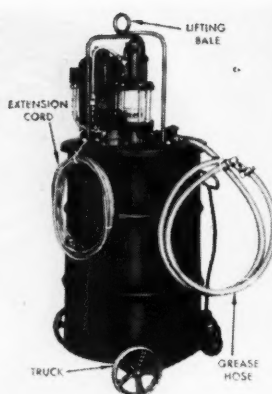
"Flatweave" is the trade name of a new wire-rope sling developed by the John A. Roebling's Sons Co., Trenton, N. J., to meet the need for a light, flexible, non-kinking, non-spiralling sling to handle loads easily. It was developed



specifically for lifting light and medium loads where the legs choke the load or the sling comes in direct contact with the load being lifted. Descriptive literature, Bulletin A-881, may be obtained from the manufacturer.

### Electric-Hydraulic Barrel Pumps

Trabon Engineering Corp., Cleveland, Ohio, has just introduced new Series II electric hydraulic barrel pumps. These pumps are operated simply by plugging the extension cord into an electric outlet, thus permitting their use around a plant any time and at any place an electric line



is available. With this electric operation, these pumps are not only adapted for service alongside a production line filling the bearings of various manufactured articles prior to their being shipped but also are suited for use by installation crews, setting up machinery in new plants, and by maintenance men working Sundays, holidays, etc., when compressed air, needed for operation of air-driven pumps, usually is not available.

### Microfilming of Drawings

In these critical times, microfilm records are essential in the coal industry as insurance against loss of operators' invaluable records due to many hazards, according to Robert G. Post, president, Microstat Corp., Pittsburgh, Pa. Storing several rolls of microstat film in separate places, he says, insures safety of drawings against loss from fire.

Specially processed 35-mm. microfilm is used to photograph records, tracings, and maps of coal mines, viz.: above ground—the mine properties and the adjacent territory; below the surface—special construction of mine shafts, tunnels, track layouts.

Depending upon the kind of paper used and the size of the copy, two men working with a microstat camera in eight hours can microfilm roughly 10 sheets a minute, or 3,000 per day; a record of 5,000 copies in one day by one camera has been accomplished, it is said. Only one man at a time is required to operate the camera. Thus two men relieve each other at will.

### Industrial Notes

AMERICAN HOIST & DERRICK CO., St. Paul, Minn., received the United States Maritime Commission Award of Merit on Sept. 18 for outstanding achievement in war production.

O. H. JOHNSON, hitherto manager, has been elected president of the Mine & Smelter Co., Denver, Colo. He succeeds Albert Seep, who resigned as president and director to go into the armed forces of the United States.

CHARLES H. MCCREA has been made president of the National Malleable & Steel Castings Co., Cleveland Ohio. He joined the company in 1913 at its Toledo works as special engineer, becoming

manager of the St. Louis office in 1923, sales manager for the Cleveland works in 1931, manager of the latter works in 1938, and vice president and director last May.

MERRITT L. SMITH, advertising manager of Metal and Thermit Corp., New York City, has been appointed assistant sales manager of the corporation. He will continue to direct advertising activities. With Metal & Thermit for ten years, Mr. Smith was formerly a member of the staff of Rickard & Co., advertising agency. Charles D. Young, formerly district manager, Chicago office, has been appointed sales manager of the welding division, with headquarters in New York City. He has been connected with the Chicago branch since its inception in 1912, being made district sales manager in 1926.

CHARLES C. CHAMBERLAIN has been named as general sales manager of Jenkins Bros., Bridgeport, Conn., manufacturer of valves and other products. Coming to Jenkins Bros. in 1929, he started as an assistant in the advertising department, and was appointed advertising manager in 1932. He will have headquarters at the general offices of the company, New York City.

JOHNSON-MARCH CORP., New York City, has appointed A. K. Canterbury, of Beckley, W. Va., to handle the sale of its Compound M and Coaladd to coal mines in ten of the counties radiating from Beckley.

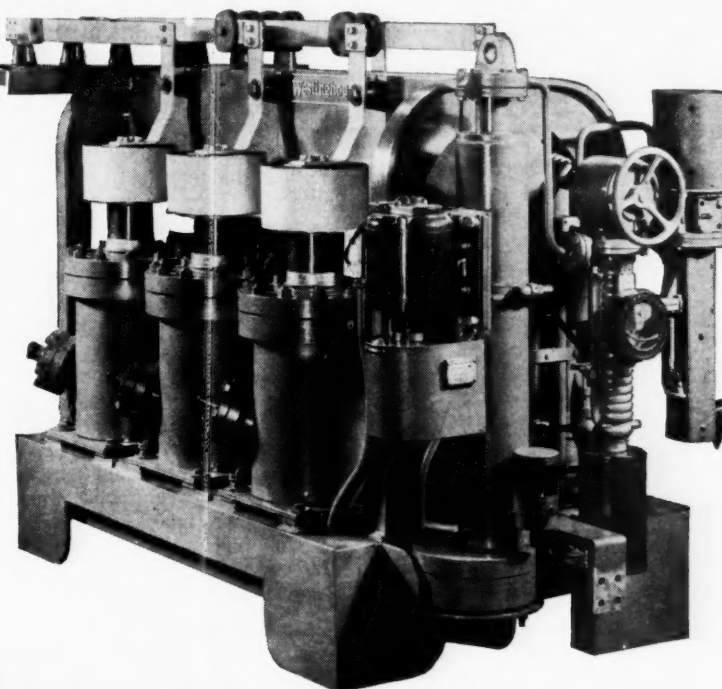
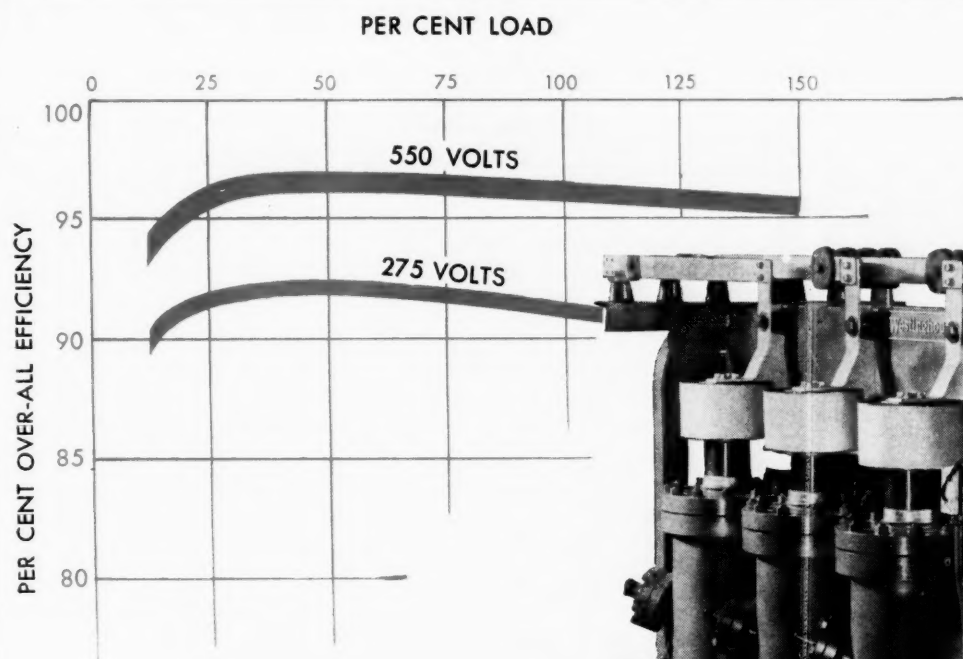
COPPERWELD STEEL CO., Warren, Ohio, has appointed D. L. Immel assistant plant superintendent.

INSPIRED by the conferring of the Army-Navy production award upon the Independent Pneumatic Tool Co., the City Council of Aurora, Ill., proclaimed Oct. 8 as the city's Army-Navy Day. The entire community participated in a series of civic events culminating in the formal presentation of the award banner and "E" emblems to the employees of the tool company. Capt. Robert Henderson, U.S.N., made the formal presentation and Neil C. Hurley, vice-president, accepted the banner for the company.

A. W. THOMAS, sales manager of the construction machinery division of Chain Belt Co., Milwaukee, Wis., has left for Washington, D. C., where he will be a dollar-a-year man as consultant with the Construction Machinery Division of the War Production Board.

WICKWIRE SPENCER STEEL CO., New York City, has appointed George L. Randall public relations manager. He has been with the company for seven years, the last as advertising manager. He will continue in charge of advertising. The Maritime Commission "M" pennant and victory fleet flag have been awarded the company's Palmer (Mass.) plant. The presentation, by Commissioner Thomas M. Woodward, took place Oct. 14.

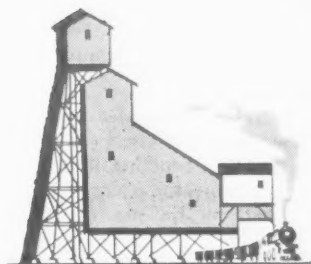
H. L. WATSON, since 1934 executive vice president and director of the DeLaval Steam Turbine Co., Trenton, N. J., has been elected president of the company, succeeding Francis J. Arend, deceased. From 1913 to 1934, Mr. Watson was



## Improved Power Conversion

that delivers

**more coal** per kilowatthour  
of a-c power input



### Fully unattended, automatic operation

No need to tie up operating or maintenance men where IGNITRON RECTIFIERS are in action! Operation can be made completely automatic, permitting units to be operated without attention even in isolated locations.



New high conversion efficiency—new high ability to take overloads without harm—means more continuous, uninterrupted d-c power for cutting, loading, and hauling coal. That's why the new, single-anode tank Westinghouse IGNITRON RECTIFIER offers important aid in today's production picture.

Even more important in mining service, short-time overloads, even short circuits, will not harm the IGNITRON RECTIFIER. Circuit breaker settings may be adjusted safely to reduce the interruptions caused by temporary peak load demands. Production consequently can be maintained more steadily.

To meet the requirements of mining service, the IGNITRON has been kept lightweight and compact. It is easily made portable. Moved periodically, it can be located near the face of the coal mining operation, thus reducing distribution losses. Write today for complete descriptive booklet B-3024, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., Department 7-N.

J-10216

# Westinghouse Ignitron Rectifiers

general sales manager. He was graduated from Rose Polytechnic Institute, Terre Haute, Ind., in 1905 and served as erecting engineer and later as sales engineer, specializing in steam turbine work, with the Allis-Chalmers Mfg. Co. until he entered the employ of the DeLaval company.

**WESTINGHOUSE ELECTRIC & MFG. CO.,** East Pittsburgh, Pa., has elected H. V. Putman, manager of the company's transformer division, a vice president. He was appointed manager of the transformer division in November, 1940. He joined Westinghouse as a design engineer on synchronous motors at the East Pittsburgh works in 1923.

**FORMAL PRESENTATION** of the Army-Navy "E" award to the Storage Battery Division of the Philco Corporation was made Oct. 7 at the division plant in Trenton, N. J.



**FOOTE BROS. GEAR & MACHINE CORP.,** Chicago, has elected Russell G. Davis to the vice-presidency. He will continue in the capacity of general manager of the industrial gear division. These promotions are announced in the sales department: F. A. Emmons is now assistant general manager; R. B. Moir is manager, sales and engineering; W. H. Ostring, special representative; Galen Butterbaugh, speed reducer sales; T. F. Hill, gear sales; Charles Look, assistant, gear sales.

**ROBERT K. JEFFREY**, 40, vice president and director, Jeffrey Mfg. Co., Columbus, Ohio, died Sept. 29 at his home. He was the elder son of R. H. Jeffrey, chairman of the board of the Jeffrey company, and a grandson of J. A. Jeffrey, founder of the company. He attended Ohio State University, Williams College and the University of Birmingham, England.

## Trade Literature

**BEARING LUBRICATION**—SKF Industries, Philadelphia, Pa. Bulletin Form 266, "A Guide to Better Bearing Lubrication"; 32 pages filled with design, formulas and graphs which help explain the functions of lubrication, oil lubrication, recommended viscosities, oil-supply systems, oil bath, circulating systems, spray or mist lubrication, wick feed, oil with compressed air, grease lubrication, how grease lubricates, ABEC grease standard, operating conditions, greasing intervals, grease-supply systems, housings with grease fittings, housing without grease fittings, grease chamber lubrication, comparative advantages of oil and grease, high-temperature applications, minimum friction applications, protection against moisture, protection of idle machinery, cleaning.

**CABLE**—General Cable Corp., New York City. Data sheet describes salient

features of the company's bus drop cable, with table of diameters and weights and installation diagram.

**CARBON BRUSHES**—Carbone Corp., Boonton, N. J. Bulletin 942 gives in convenient form a number of useful references, including a table of applications, brush definitions, standard shunt connections, and detailed specifications of a number of frequently used grades.

**COAL CRUSHERS**—McNally Pittsburg Mfg. Corp., Chicago. Bulletin 442 illustrates a practical 2-stage coal crushing circuit with drawing and description, including all features and crushing recommendations, as well as capacities, dimension tables, and drawings, plus test results on different coals.

**COUPLINGS**—Phillips Mine & Mill Supply Co., Pittsburgh, Pa. Bulletin describes and illustrates mine and industrial car-coupling pins and coupling links. Five types of coupling pins and five types of links are shown.

**EARTH MOVERS**—Baker Mfg. Co., Springfield, Ill. Booklet entitled "Unsung Heroes of War" depicts Baker bulldozers, graders, wagon scrapers, road discs, road roters, maintainers and snow plows at work on many of the construction projects that have been and must be completed before any real fighting can be done. Pictured are such jobs as stripping overburden at coal mines and diatomaceous earth deposits, building logging roads, clearing pipeline right-of-way, digging water holes for "beef" cattle to increase food production for the United Nations and other jobs.

**EQUIPMENT FOR MINES AND PROSPECTORS**—Ingersoll-Rand Co., New York City. Booklet contains 72 illustrations and data on rock drills, detachable bits, reconditioning equipment, hose lines, hoists, pumps and air compressors.

**INDOOR OIL CIRCUIT BREAKERS**—Roller-Smith Co., Bethlehem, Pa. Catalog 3350 describes and illustrates 15,000-volt oil circuit breakers for indoor service classes 150-TCR-3 and 250-TCR-3. Listed are the various sizes of breakers with their interrupting ratings, closing and tripping currents, quantity of oil required and approximate shipping weights. Control diagrams, methods of tripping and dimensional data also are given.

**LATHES**—South Bend Lathe Works, South Bend, Ind. Catalog No. 13 completely illustrates and describes South Bend 13-in. toolroom lathes and engine lathes. Attachments, accessories and tools for use with the lathes are also listed. Construction features of the quick change gear box, carriage, spindle bearings, motor drive, etc., are shown. A full page of tabulated specifications gives essential information on capacities, feeds, speeds, and dimensions. Catalog No. 67-W fully describes and illustrates 2H turret lathes and the numerous attachments and accessories available for adapting them to various types of production work. Im-

portant construction features and their operation are explained. Tabulated specifications give full information on capacities, speeds, feeds and dimensions.

**LUBRICATION**—National Graphite Co., Inc., New York City. Folders describes Konag transparent cutting oil for fast, efficient machining of tough, tool-resistant sheets. Bulletin tells about Konag water-soluble castor oil jelly as an effective coolant for screw-machine work and high-speed operations on softer metals and shallow cuts.

**MAINTAINING TRACTORS AND ROAD MACHINERY**—Caterpillar Tractor Co., Peoria, Ill. Booklet entitled "Keep 'Em Working" designed to aid owners of Caterpillar products in getting the most out of their machines. It gives the reasons behind the maintenance and operation instructions, goes into detail on the care of certain critical parts and gives general information not conveniently available elsewhere.

**OPERATION-TIME RECORDERS**—Foxboro Co., Foxboro, Mass. Bulletin A-321 explains the application of operation-time recorders, both electric-operated and mechanical, to the processes of various industries. Their importance in test engineering, in setting job standards and in cost accounting and production control is discussed, and diagrams show typical installation of recorders for several different kinds of work. Complete specifications are included, for single- and multiple-pen instruments.

**PYROMETERS**—Leeds & Northrup Co., Philadelphia, Pa. Catalog 33A, on Micro-max thermocouple pyrometers, tries to give first-hand information about available instruments—indicators, recorders and controllers—and about the thermocouples and accessories which are used with them. Tells how the basically sound balance method is applied to the measurement and control of thermocouple temperatures.

**RUBBER BELTING**—F. B. Goodrich Co., Akron, Ohio. Booklet entitled "Rubber Conservation for Users of Industrial Rubber Belting" contains illustrated step-by-step procedure for making repairs on conveyor belts by the use of portable electric vulcanizers as one of its principal features. Subheadings include "Rubber Can Be Saved by Making Vulcanized Repairs Promptly," "Rubber Can Be Saved by Salvaging Belts for Smaller Drives," "Rubber Can Be Saved by the Plylock Splice," and "Rubber Can Be Saved by Proper Care."

**RUST-PREVENTING PAINTS**—Rust-Oelum Paint Corp., Evanston, Ill.; catalog contains directions for proper application of rust-preventive coatings, color chips illustrate the variety of products available, and explanations of where and how these materials may be used to insure maximum protection. Included are descriptions of special coatings designed to inhibit corrosive action of fumes, humidity, brine, etc., and special applications to be used where wide variations in temperature require unusual elasticity; also brief descriptions of industrial wall and floor enamels for inside and outside use, house paints, asphalt paints and sealers.



# MACMILLAN PIONEERS AGAIN!



New  
1-Quart Container  
Without Metal for  
RING-FREE  
MOTOR OIL!

NON-REFILLABLE

**H**ERE IT IS! The quart container for motor oil which motorists and dealers have been expecting! And it's Macmillan who pioneers again! A "can" without metal for RING-FREE!

With the steel mills converted to war purposes, the supply of metal cans for oil has dwindled and virtually disappeared. That was natural and right.

But motorists, wanting to be sure of getting RING-FREE—in its own quickly identified quart containers—have been hoping that this difficult packaging problem would be solved.

Now the new quart is ready! Now every independent dealer selling RING-FREE can open this new container and put in the fill of RING-FREE every car has been thirsting to get!

Among other things, Macmillan pioneered with RING-FREE motor oil ten years ago. There never has

been an oil like it. There can't be, because it's refined by an exclusive, patented process.

That's why it removes carbon, saves as high as 10 per cent on gas, reduces friction fast, saves wear and repairs and lengthens the life of your car.

Now Macmillan pioneers again—after months of search and research—bringing out a metal-less container to assure motorists of getting RING-FREE!

The Macmillan sign is shown at independent filling stations, garages, and car dealers. Drive in and get your fill of RING-FREE today!



MACMILLAN PETROLEUM CORPORATION

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**35c**  
A QUART IN U.S.A.

# HAZARD LAY-SET *Preformed*

*Saves Money - Gains Time - Defends Production*

AND  
CONSERVES STEEL  
FOR THE NATION

## MODERN WIRE ROPE DIGEST

not fear will injure them. They handle them with speed and confidence. Such ropes are an aid to production as well as an assurance against costly accidents. These ropes also afford additional protection for sheaves, drums and other equipment that can be injured by a "porcupined" rope. For example, when a porcupined rope goes over a sheave, the jaggars are crowded back into the rope body where they seriously disturb the construction of the rope and the normal functioning of other wires and strands. Thus the life of the rope is greatly shortened.

### PREFORMED Ropes are Quickly Installed

The PREFORMED wire rope saves money for many users by the ease and speed with which it is installed. It is removed from the coil or reel on which it was delivered without danger of kinking. It is more easily and quickly threaded. The first layer winds on the drum uniformly and establishes a secure foundation for the perfect spooling of successive layers. Even when the fleet angle departs from the normal, as it frequently does, it is not nearly as difficult to secure good spooling as in the case of non-preformed rope. To say that it cuts in half the time of reeving and installing is conservative. The savings that count for even more are those secured through reducing the length and frequency of shut-downs — through keeping production going and preventing unnecessary disturbances of schedules on which other equipment is operating.

### PREFORMED Ropes are Pre-Broken-In

When a non-preformed wire rope is started to work, right after installation, great care should be taken to break it in slowly, to form it to some extent for the work

● In its chapter on "Preformed Wire Rope" the MODERN WIRE ROPE DIGEST explains in detail why Hazard LAY-SET PREFORMED is superior, in so many ways, to non-preformed rope. Here is a reproduction of page 94 of that book—a page that covers, at least inferentially, the points of safety, faster and easier handling, in-

creased machine production and long rope life. Ask your nearest Hazard representative to tell you about this greater-dollar-value rope. Every Hazard man has inherited 96 years of wire rope-making experience. He is qualified to help you.

## HAZARD WIRE ROPE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles,  
New York, Philadelphia, Pittsburgh, San Francisco, Tacoma  
AMERICAN CHAIN & CABLE COMPANY, Inc.  
BRIDGEPORT, CONN.

HAZARD LAY-SET *Preformed* WIRE ROPE

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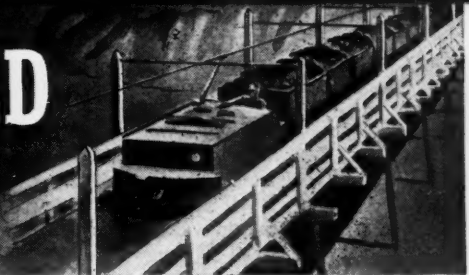
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## Mineral Industries Now Have Fine Building At the University of West Virginia

A BUILDING for mineral industries instruction and research involving a million dollars for construction and equipment, and in course of erection since 1940, was dedicated Oct. 16 at Morgantown, W. Va. Erected on the West Virginia University campus, it will be the home of the State's School of Mines, the West Virginia Geological Survey, the department of geology and the department of chemical, metallurgical and ceramic engineering. Thoroughly modern in architectural design and with many unusual conveniences for effective operation, this six-story building is a leader among institutions of this type.

On the first floor is an amphitheater with a large interpretive cartoon by R. L. Leeper, of Pittsburgh, which, occupying the entire width of the stage, envisions the several processes, natural resources, finished products, equipment and workers in the several State industries. Passages in the basement have been provided that resemble a mine heading, with its pillars and crosscuts. In this building, experiments will be conducted into the problems of ventilation. In the preparation laboratory, coal is handled by standard conveying, crushing and elevating equipment, including a Baum-type automatic coal washer, a cone-cleaning unit, a heavy-liquid coal cleaner, a Simplex jig, two types of concentrating tables and many other testing units.

A special research laboratory, furnished with a constant-temperature and constant-humidity room, corrosion testing equipment, dustiness cabinets and coal-treating for dustproofing coal, also is provided. Combustion tests also will be made with other equipment.

Gratification was expressed that it was possible to honor the memory of I. C. White, former State geologist, who did much original and basal geologic work, by the erection of the building on the ground on which his residence formerly stood—a symbol that it was as a result of his activity, work and counsel to the State and its engineers and geologists that this handsome edifice, many years after his decease, arose.

After a military review, in honor of Governor Matthew M. Neely, presentation of keys by R. F. Roth, president, State Board of Control, and an acceptance speech by Charles E. Lawall, president of the university, the Governor delivered an address declaring his intention of working for the addition of medical and aviation departments to the university. Quoting Theodore Roosevelt, M. M. Leighton, di-

rector, Illinois Geological Survey, said: "Every step of the progress of mankind is marked by the discovery and use of natural resources previously unused." This temple of research, Dr. Leighton added, should make possible such discovery and use, thus bringing about a better

order, a better well-being and a better humanity. "As C. P. Kettering, vice president, General Motors Corp., has well said," continued Dr. Leighton, "no one can look into the future except through the windows of the research laboratories."

In contrast with 30 million registered in the Selective Service, declared Sidney D. Kirkpatrick, editor, *Chemical & Metallurgical Engineering* and president, American Institute of Chemical Engineers, we have only about a quarter of a million names on the National Roster of Scientific Engineering and Specialized Personnel. That roll includes every college graduate in science, engineering, medicine, dentistry, biology, bacteriology, etc. He believes it safe to say that the war will be won or lost by the use made of the 250,000 in that list, even if the nation should have to put the rest of the 30 million in uniform. We need not only resources but resourcefulness. Both are exceedingly important in these critical times. But, so far in this great global war, we have talked too much about the former and too little about the latter."

In developing the slogan, "What helps coal helps you," Raymond E. Salvati, vice president, Island Creek Coal Co., at luncheon Oct. 17, said that the coal industry in the State paid about \$200,000,000 in 1941 to its employees, and so paid almost 40 percent of all the wages received in the State while employing only 33 percent of the workers.

The coal industry brings \$652,000,000 into the State in payment for coal and freight. Another \$30,000,000 or more is spent largely in the State for mine supplies and equipment. The industry has about one-third of all the workers in the State on its payrolls.

"Young engineers, an element that was looking for jobs a few years ago," said Eugene McAuliffe, president, American Institute of Mining and Metallurgical Engineers, at the banquet, "are today in the 'critical metal class' . . . The machine age that was ushered in with the invention of the steam engine found a world immersed in ignorance and privation. All society was stratified, a thin layer on the top that enjoyed adequate food, shelter and clothing; the mass below living in squalor. Came the engineer, the inventor and abounding plenty for the common man; more goods, food, shelter, clothing, travel, books, more leisure and more of human liberty. . . . Some years ago, a brilliant woman engineer, Dr. Lillian M. Gilbreth, who attained a high place in the scientific, engineering and literary world (and I often wonder why we do not have more woman engineers) said: 'An engineer is a person who believes

### Keeping Step With Coal Demand

#### Bituminous Coal Stocks

	Thousands	Net Tons	P.C. Change—	From	From
		Sept. 1 1942	Aug. 1 1942	Sept. 1 1941	Aug. 1 1941
Electric power utilities.	18,165	+4.8	+66.5		
Byproduct coke ovens.	10,238	+3.2	+42.1		
Steel and rolling mills.	1,235	+4.9	+63.1		
Railroads (Class I).	13,463	+4.4	+65.9		
Other industrials*.	30,086	+8.7	+71.2		
Total.	73,187	+6.1	+62.6		

#### Bituminous Coal Consumption

	Thousands	Net Tons	P.C. Change—	From	From
		Aug. 1942	July 1942	Aug. 1941	July 1941
Electric power utilities.	5,679	-0.6	+0.6		
Byproduct coke ovens.	7,508	+0.05	+5.6		
Steel and rolling mills.	769	+1.5	-8.7		
Railroads (Class I).	9,366	+3.2	+3.8		
Other industrials*.	11,365	+0.9	+16.1		
Total.	34,687	+1.1	+7.0		

\* Includes beehive ovens, coal-gas retorts and cement mills.

#### Coal Production

##### Bituminous

Month of September, 1942, net tons	48,760,000
P.c. change from September, 1941.	+2.7
January-September, 1942, net tons	429,060,000
P.c. change from Jan.-Sept., 1941.	+19.2

##### Anthracite

Month of September, 1942, net tons	5,418,000
P.c. change from September, 1941.	+1.6
January-September, 1942, net tons	45,446,000
P.c. change from Jan.-Sept., 1941.	+6.8

#### Sales of Domestic Coal Stokers

##### Vs. Oil Burners

	Coal Stokers	Oil Burners
August, 1942.	7,961	2,108
P.c. change from Aug., 1941.	-71.8	-89.5
January-August, 1942.	65,560	43,685
P.c. change from Jan.-Aug., 1941.	-44.9	-66.6

#### Index of Business Activity\*

Week ended Oct. 17 (preliminary)	188
Percent change from month ago.	+0.3
Percent change from year ago.	+10.7

\* Business Week, Oct. 24.

#### Electric Power Output†

Week ended Oct. 17, kw.-hr.	3,717,360,000
Percent change from month ago.	+4.1
Percent change from year ago.	+12.2

† Edison Electric Institute.



in measurement, who knows how to measure, does measure and is willing to abide by the results of his measurement, whether they suit his preconceived notions or not."

Other activities accompanying the dedication were meetings of the West Virginia Coal Mining Institute (right), geologists from West Virginia and nearby states and the Allegheny Section of the Society for the Promotion of Engineering Education.

### Nazis and Britons Faced With Strict Coal Restriction

With every ounce of coal being used to keep Nazi war production factories going, householders in the Reich and German-occupied countries of Europe are faced with an acute shortage of coal for heating and cooking purposes during the coming winter, according to officials of the British Ministry of Economic Warfare. A Ministry spokesman predicted that German householders will not have, at the most, more than two-thirds of their pre-war coal needs, while the rest of Europe will vary from one-half its needs to none at all.

Though admittedly faced with rigid coal restrictions this winter, an official spokesman said Great Britain will be far better off than most of the lands in Nazi-dominated Europe. Confronted with the necessity for keeping war factories going full blast, British domestic consumers are faced with the problem of reducing consumption by 20 to 25 percent.

The British government has refused to withdraw any more men from the armed forces to work in the coal mines or to institute compulsory rationing, thus leaving to the resourcefulness and good will of producers and consumers the stupendous task of bridging an estimated deficit of 11,000,000 tons, the House of Commons was told in debate on the problem. Major Gwilym Lloyd George, Minister of Fuel, asserted the deficit "can be met by increased output and by decreased consumption in domestic and industrial fuel. It is within the power of the people of this country to close the gap and it is within their power to do it without any hardship at all." I have every reason for assuming we will save at least 4,000,000 tons in domestic consumption."

American mining methods and machines will be introduced into a limited number of British mines in an effort to close the prospective gap between fuel output and consumption, Major Lloyd George said. "We have already ordered from the United States as much machinery as we can reasonably hope to get in a reasonable period," he added. Satisfactory progress has been made in reorganizing the mining industry and an industry survey is being directed by an American mining engineer.

### Women Work at Coal Mine

Union Pacific Coal Co. has hired 25 women for work at its Rock Springs (Wyo.) mine. Twelve are to work in the mine shops and the others are to pick slate on mine tipples, it was announced. It is the first reported instance of women being employed in the coal industry of the intermountain area.

## Counsel for Belt Users and Correctives for Labor Shortage Presented at Morgantown

**Rubber Belts Will Live Long Only With Proper Installation and Maintenance—How to Achieve Both—Need for More Working Days, More Hours per Day, Higher Efficiency, Fewer AWOLs and Holidays**

CONSERVATION of rubber for industrial uses and the great need for extending the hours of mine labor and of keeping such men as are now employed at their present work in order to meet the pressing need for coal, more coal and still more coal, occupied the time of the 35th annual meeting of the West Virginia Coal Mining Institute, held Oct. 16 and 17 at the new Mineral Industries Building, West Virginia University, Morgantown, W. Va., where the members participated also in the dedication proceedings of that edifice.

**Handling Rubber Belts**—Care in the handling of rubber belts in the interests of the conservation of rubber was stressed by E. H. Anderson, a representative of the Goodyear Tire & Rubber Co., using a sound film to supplement his remarks. When belts have to be "reefed"—that is, superposed in layers by folding them back and forward in short lengths—no weight should be laid on them, or the belt carcass will be put under undue stress. In installing the belt on the rollers, side-guide idlers should be used to keep the belt in place, but, when the system is ready for operation, the belt should be "trained" or kept in line, if necessary, by self-aligning idlers, and not by any form of side restraint.

### KEEP RETURN ROLLERS CLEAN

Belts should have crowned tail and take-up pulleys to keep their center lines immediately over those of their pulleys and rollers. Return rollers tend to become dirty and must be kept clean, or the belt will run over against the idler supports, wearing the belt's edges. A rubber scraper installed under the head pulley will keep the belt clean. Tail pulleys at conveyor terminals should be 2 ft. clear of the floor, for material will be spilled at these points and will accumulate rapidly. The center of the discharge pulley of the upper of two belts in tandem should be 6 to 10 ft. outby the center of the tail pulley of the lower belt, and the belt surface at the under side of the discharge pulley of the upper conveyor should be 2 ft. clear of the top of the belt of the lower conveyor.

**Decking Keeps Belts Clean**—By placing a decking, or small platform, between the upper and lower runs of the conveyor, excess material spilled from the upper run will be kept from fouling the lower run and from being carried back to the pulley faces. The upper run of the lower belt as it approaches the loading point should be in the form of a trough. To assure that, at least one troughing roll, therefore, should be provided between the tail pulley of the lower conveyor and the chute, and the crown of the pulley should be level with a horizontal drawn at the half depth of the belt trough.

**Skirt to Keep Coal on Belt**—A skirt is provided to make the coal from the discharge pulley fall onto a lower belt

without spillage, but the steel structure of chute and skirt should everywhere be 2 in. away from the belt surface or it may cut the belt. More clearance should be provided at points further along the belt where material trapped between belt surface and skirt may be trying to free itself. The upper belt should discharge symmetrically about the center line of the lower belt or the latter will be gradually displaced by its imbalance and shift sideways away from the point of loading, and material also will be spilled on the opposite, or loading, side. Damage to the belt usually occurs at loading points and operation there should be closely supervised.

**Where Impact Is Severe**—Rock, when being loaded on a belt, will often cut it seriously, but the severity of its impact can be cushioned by using rubber-covered or pneumatic idlers to give a flexible support to the belt at this point. Further protection could be afforded by the introduction of a grizzly with gently fanned bars; the fine material will then pass through the grizzly and provide a stratum of fine-size material on which the coarser material can travel and a slight splaying of the bars will prevent the coarser material from choking on the grizzly. The belt should be well supported under the skirt, so that no fines or larger material will get between it and the belt.

### LEAVE ROOM FOR LUMPS

Chute width should be at least twice the size of the largest lumps and, if the lumps have a large percentage of fines, the width should be  $3\frac{1}{2}$  times as great, if the lumps are uniformly large. The width of the chute must not exceed two-thirds of the belt width. By advancing and raising alternate ends of the return rolls nearest the tail pulley, the belt as it approaches that point will tend to get on true centers. Wherever possible, splices should be vulcanized.

**Cause and Cure**—Scuff marks and indentations may form a blurred path on the pulley side of a belt. This is evidence that a bolthead in the pulley is protruding and that the lagging by which it originally was covered has worn or rotted away. If many short longitudinal breaks occur parallel to the edge of the belt and on the pulley side, they are due to the impact of heavy material, and the fall should be reduced or cushion idlers should be provided. If, however, they are on the conveying side, they have been made by material trapped between the tail pulley and the belt, and scrapers should be installed on the return run just ahead of the tail pulley.

Excessive tension may cause crosswise carcass breaks, across the belt and away from the edge, in which case the take-up tension should be eased until the belt begins to slip; then the pull on the belt



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### until this plant switched to Tycol Green Cast Greases

Lubricating a soap-cooling machine consisting of two large steam heated drums and two water-cooled rolls was a continuous problem to this plant. Steam passing through the roll hubs at 300° F. made bearings so hot that grease quickly thinned down and dripped away. Even though grease boxes were filled every day, bearings were constantly burning out. Then a Tide Water engineer recommended switching to Tycol Green Cast Grease. Since making the change this plant has ended former lubrication worries, and cut down extravagant grease consumption.

"Our practice now," says the plant superintendent, "is to put about five pounds of grease into each box and almost forget about them for two weeks or longer. Tycol is undoubtedly the right grease for the job. It stands the high temperatures and does a thorough job of lubricating. The amount of grease we save, the repair bills we avoid, and the hours of labor we do away with make this decidedly an example of how waste can be eliminated by using the correct grease." Tycol Green Cast Greases are made with fine quality cylinder oils and a minimum of soap. More cylinder oil — less soap means better lubrication under all operating conditions.

Let a Tide Water engineer show you how to step up production through efficient lubrication. Write the Tide Water Associated Oil Company, 17 Battery Place, New York, N. Y.

#### **DRUMS! DRUMS! DRUMS! DRUMS!**

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## LONGER LIFE FOR CAR WHEELS



Care and maintenance of coal car wheels is vital today! Proper lubrication, checking of bearings, and wise use of brakes will help your wheels last out the duration.

Brown-Fayro wheels are cast in machined chills of special alloy iron (giving a hard tread) backed by tough close grained iron. Wheels for both anti-friction bearings and plain bearings are accurately machined. In B-F "Ring-Oiler" Wheels for plain bearings—the oil ring carries an ample supply of lubricant for all hauling speeds.

Also Mfr's of: "Brownie" Hoists, Blowers, Pumps, Retarders, Mine Cars, Rollers and Sheaves. See PP. 43, 103, 123 of the Coal Mine Catalog.

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JOHNSTOWN, PA.

should be increased just enough to cure that defect under all conditions. Mildew of the carcass also may create such points of weakness, in which case elements favoring mildew should be removed or a mildew-resistant belt substituted. Crosswise breaks at the edge of the belt may be due to the idler nearest the head pulley being located too near that pulley or too much above it. Or it may be that the edge of the belt is being forced against an obstruction or pressed too tightly against a side-guide idler. However, the defect may be the result of mildew.

**Out of Center**—When the belt runs off center at some one point in the system, it is improperly aligned. If it runs off in any instance at a single point, but at different times at different points in the system, the belt is not cut square and needs resplicing. Should the plies separate at the edge of the belt, it is a sign that the belt is rubbing and it should be brought back to centers or the obstruction by which the belt is rubbed should be removed. If the plies separate at idler joints, the carcass is not rigid enough for the load, and the belt should be used as long as it will serve its purpose and, when replaced, its successor should have more plies or a heavier duck.

When the belt cover becomes cut and fine material works between the cover and the carcass, a cover blister, or sand blister, is formed, in which case a spot repair must be made with a vulcanizer. Care should be taken to keep oil from the belt and to use only just enough lubricant to keep bearings in running condition.

Mr. Check says:

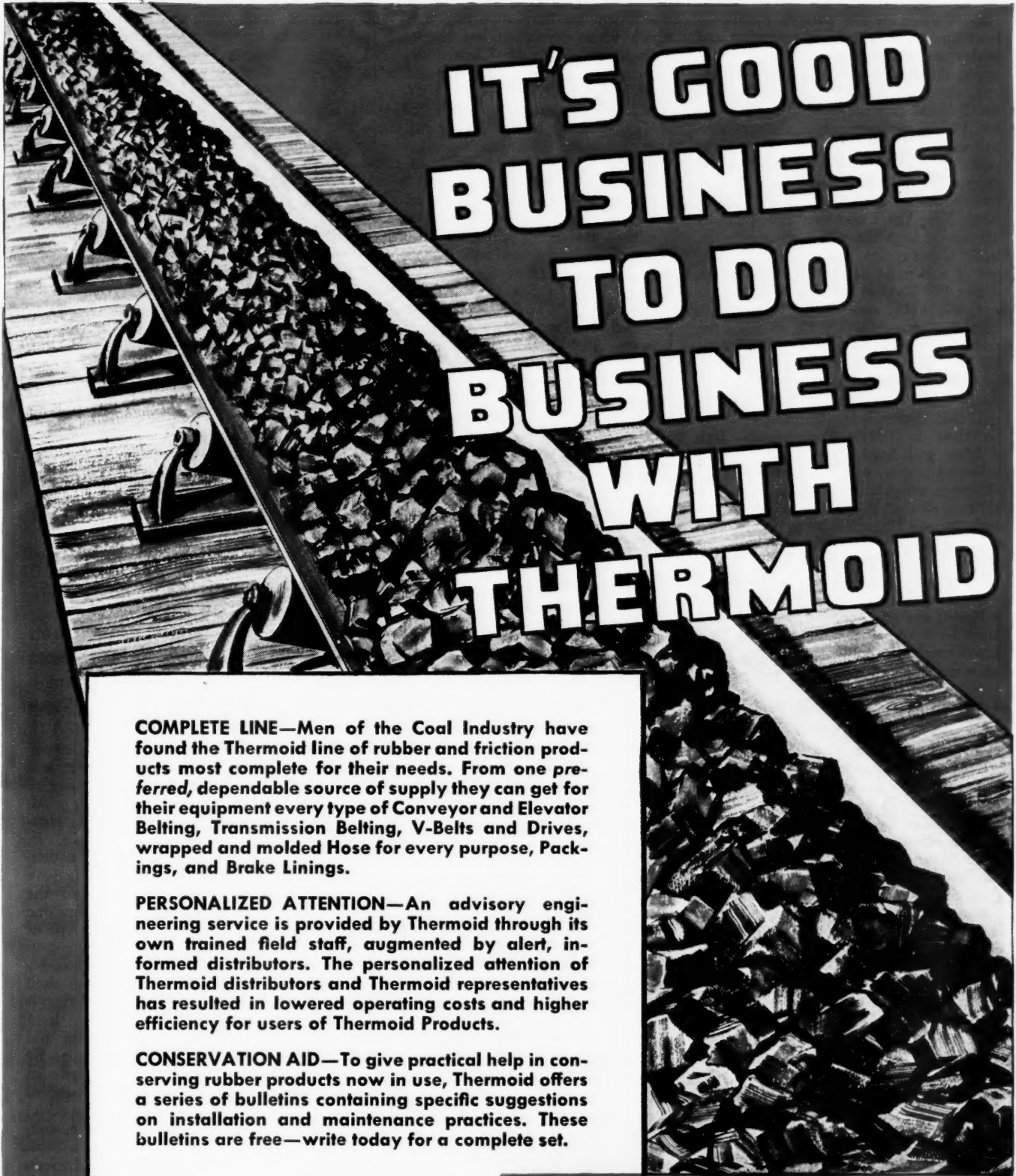
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### WEST VIRGINIA INSTITUTE'S SELECTEES FOR 1942-1943

John T. Sydnor, vice president, West Virginia Coal & Coke Corp., Omar, W. Va., president; M. H. Forester, general manager, Consolidation Coal Co., Fairmont, W. Va., first vice president; Lawrence Tierney, president, Eastern Coal Corp., Bluefield, W. Va., second vice president; Joseph Pursglove Jr., president, Cornell Coke Co., Morgantown, W. Va., third vice president; J. J. Foster, assistant to vice president, Island Creek Coal Co., Holden, W. Va., fourth vice president; William Findley, general superintendent, Simpson Creek Colliery Co., Galloway, W. Va., fifth vice president. Members of the executive board are Caryl Robinson, consulting engineer, Robinson & Robinson, Charleston, W. Va.; F. F. Jorgensen, labor commissioner, Northern West Virginia Coal Association, Fairmont, W. Va.; C. W. Connor, general superintendent, Nellis Coal Corp., Nellis, W. Va.; W. G. Crichton, vice president, Johnstown Coal & Coke Co., Charleston, W. Va., and T. E. Johnson, secretary, Northern West Virginia Coal Association, with D. L. McElroy, director, School of Mines, West Virginia University, Morgantown, W. Va., secretary-treasurer.



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## Thermoid Rubber

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**Short Time Makes Meager Product**—Short hours, short weeks, absenteeism and holidays are imperiling the nation's coal supply, declared Eugene McAuliffe, president, American Institute of Mining and Metallurgical Engineers, at the session of Oct. 17. The observance of a single holiday with its aftermath of absenteeism results in a loss of 2,000,000 tons of bituminous coal. It is time that decision is made to work on Armistice Day, Thanksgiving, New Year's and similar holidays. A fuel famine faces the nation, especially the Pacific Coast region, into which 1,068,000 tons of coal must be moved from sources outside the State of Washington between Sept. 15, 1942, and March 31, 1943.

**Shortage on Pacific Coast**—Of the production of that State, 1,000,000 tons will be required for railroad use, leaving only 600,000 tons for war activity and general use, yet, because of a labor shortage, that State will produce in 1942 less than in 1941. Concurrently, lack of labor and trucks has cut down the fuel-wood supply, which normally is 500,000 cords, roughly the equivalent of 250,000 tons of coal. Growth of shipbuilding, airplane and other war activities and mobilization of Army and Navy forces, spurred on by the fact that the Pacific is even more important than the Atlantic in the war effort, has created a need for fuel coal, and at the same time the coal mines have lost to the war factories their skilled mechanics and younger and more active workmen.

#### PANIC DEMAND WITH WINTER

Though there is now no shortage because of the warm weather, winter will bring a demand approaching panic proportions. In the winter the railroads in the West demand 25 to 50 percent more coal, because trains have to be headed by two locomotives instead of one; heavy headwinds hamper transportation, and trains have to be heated.

**Asked for 165 Percent More Coal**—During the depression, when demand was dried up by its absorption by oil and gas, the Union Pacific Coal Co. was producing only 2,000,000 tons annually. It is now asked by the railroad to supply 5,300,000 tons. Always a non-commercial company, when requested it has supplied coal to commercial companies and of late has been selling coal to the federal government. To meet the emergency, the Union Pacific now has 25 women at work, some in tipples and some in the shops, all receiving men's rate of pay and all wearing safety clothing. They probably will do better work than men, added Mr. McAuliffe.

**Absenteeism**—Time must be extended in the coal mines, and the absenteeism of 140 to 250 men daily in the company's mines must be stopped. In July, August and September, 10,073 man-shifts were lost, 90 percent of which absenteeism was inexcusable. Efficiency is falling about 1 percent per man per month. It is now down to 81.1 percent of its prewar value. It is suggested by the union that coal be obtained from Iowa, which has never supplied more than a part of that State's requirements and whose coal generally is of poor quality, or from Illinois,

which will be busy supplying itself and which union regulation has restricted to a single shift daily of 7 hours. Railroad cars and locomotives are not available to haul such coal.

If the government would let the railroads alone and let the men who know how to operate the railroads do their job, they could relieve a great many of those employed in Washington, said John D. Battle, executive secretary, National Coal Association, at the luncheon Oct. 17. There is not much difference he added, between their position and ours; if the coal industry is given the men and the tools it can do the job. The Mining Section of the War Production Board has provided that we receive the tools, but between 50,000 and 70,000 men have left the coal-mining industry either for the military forces or for defense industries.

Nothing seems to move the Selective Service to a realization of the industry's needs. Also, with the approval and acquiescence of the U. S. Employment

Service, men are being moved long distances by contractors on government jobs. The employees of the service seem to feel they are not doing their duty if they fail to get a man another job, even if he already has a job in a coal mine. Discussion of the longer work week and the longer work day arouses a difference of opinion because what may be equitable and fair in one section may be wholly inappropriate in another. If any man, employed in the coal industry subject to the Wage and Hour Act, works more than 40 hours during any one week, no deductions may be made from his pay envelope, if in those deductions a penny of profit is involved. There is also the question of the ceiling on prices.

The new tax bill that confronted the American people actually penalized a coal mine that is increasing its production over the so-called base period 1936-1939. Certain relief provisions have been written into the bill by the U. S. Senate as a result of the representation of the National Coal Association.

## How to Switch Oil Furnaces to Coal and Use Anthracite in Coke Aired at St. Louis

**Consumers Are Having to Burn New Fuels and Must Adapt Their Equipment to Them and to the Demand for More Steam—Mistakes Will Be Made Unless Coal Men and Users Study This Problem—Use of Anthracite Has Clipped Many Hours From Coking Time**

IMPACT of the war on coal problems marked the fuels conference held by the American Institute of Mining and Metallurgical Engineers, Coal Division, and the American Society of Mechanical Engineers, Fuels Division, at St. Louis, Mo., Sept. 30 and Oct. 1, with the A.I.M.E. regional meeting Oct. 1 and 2. Subjects included how to make coke of suitable size in the present shortened coke time; how clinker tendencies are bedeviled by the specific gravities of the impurities in coal; how cost of stoker maintenance can be decreased and inefficient combustion cured; how coal can be pulverized at the mine and distributed in powder form to the consumer; how gas and coal can be used in a single boiler together or separately, when conditions favor the use of either fuel; how changes in coal quality and characteristics and concurrent demands for more steam can be met; how coal and oil can be burned together as a "colloidal fuel" and how mine machine shops can adapt their practice to war production and to the necessities arising from the war. Priorities in mine supplies were discussed by D. L. McElroy, chief, coal section, Mining Branch, War Production Board.

**Anthracite as a Coke Ingredient**—In the past, fine inerts have been mixed with the charge in the byproduct coke oven to obviate the formation of fractures in the coke, thus assuring a blockier product, declared I. M. Roberts, assistant chief chemist, Laclede Gas Light Co., St. Louis, Mo. Coke breeze can be used, but grinding costs \$1 or \$1.50 a ton and, because of

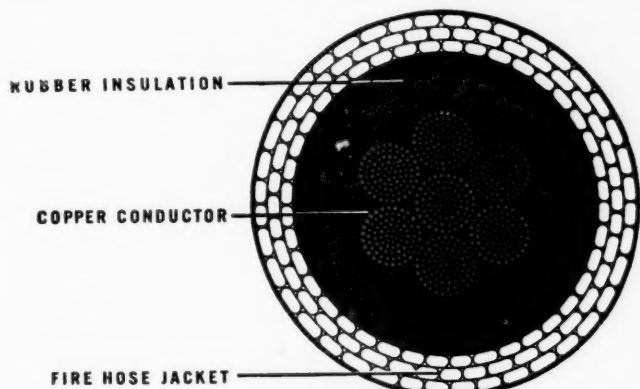
priorities, purchase of the grinding equipment is difficult. Anthracite of the size known as buckwheat No. 5 is already of the desired fineness and, when used, grinding is not necessary; it also, by its combustion, delivers heat to the furnace. It, moreover, is low in sulphur, but all anthracite is not equally suitable. Others have failed to get favorable results, and the success at the Laclede plant has been due to the care taken to get the right type of anthracite.

The Laclede requirement for foundry coke, said Mr. Roberts, is that it shall pass over a 3x3½-in. grizzly screen, that it shall be of satisfactory strength, free from fractures as received from the oven and resistant to fracture in later handling. By replacing with 4 percent of anthracite an equal part of the regular 40 percent of low-volatile coal in the mix, a product can be made, in short coking time, containing a much higher percentage of such coke. This change has enabled the Laclede company to carbonize about 130 tons more coal per day, while still recovering from each oven charged with the foundry mixture about twice as much coke of foundry size as it did when it provided a longer coking time and did not sweeten the mix with anthracite.

**Cut Time From 26 to 18½ Hours**—To produce a good foundry coke, Laclede normally operated on a coking rate of not less than 26 hours. The demand was such that the coking time was reduced to 21½ hours, as short as would suffice for an acceptable product. However, with the use of anthracite fines, the ovens are now

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**1. Saves up to 50%  
rubber in mining cable**



**2. Saves down-time losses  
in vital mine production**

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The Duracord covering is woven like a fine hose—*not braided*. This tough yet flexible cover

replaces the rubber jacket on all-rubber cords making possible rubber savings as high as 50%.

For further information, please send us your inquiries.

**SUNEX SECURITYFLEX\* TO WAR**

This well-known all-rubber



Two marks of achievement—the cherished Navy "E" (awarded to two of our plants) for achievement in production... The Anaconda trade-mark for achievement in quality.

companion to Duracord has been preempted for the toughest kind of jobs in the war effort where all-rubber cord is mandatory. Until peace, its use will be strictly regulated. 42286

\*Reg. U.S. Pat. Off.

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*Subsidiary of Anaconda Copper Mining Co.*

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**ANACONDA WIRE & CABLE COMPANY**



## ARE YOU SERVING THE RISING SUN?

"Much obliged" says Hirohito, every time a mining machine is put out of service because of a cable failure. Remember, he has his dirty hands on 90% of the world's rubber supplies. So it's a job for every one of us to s-t-r-e-t-c-h the life of our portable cables . . . to see that they are treated carefully *and right!* For example:—

When not in use, dry the sheath thoroughly and coil up—never suspend from a nail or hook. Store cable in a dark, cool place—never where it is subjected to sunlight, dampness, excessive temperatures. Guard against oil dripping on the sheath. In removing oil, avoid the use of gasoline and other volatile cleaning agents—a washing soda solution is best. And, most important, make repairs promptly and properly.

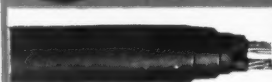
### JOHN A. ROEBLING'S SONS COMPANY

TRENTON, NEW JERSEY

Branches and Warehouses in Principal Cities



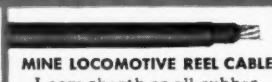
**ROEBLING MINE WIRES AND CABLES  
HAVE ENLISTED FOR THE DURATION!**



**MINE ENTRY CABLE**  
Non-metallic—Rubber



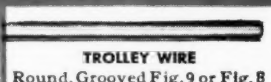
**MINING MACHINE CABLE**  
Loom sheath or all-rubber



**MINE LOCOMOTIVE REEL CABLE**  
Loom sheath or all-rubber



**BORE HOLE CABLE**  
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Round Wire Armor



**TROLLEY WIRE**  
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**ARMATURE AND FIELD COILS**  
For Motor Repair

**PROMPT SHIPMENT TO  
MEET ESSENTIAL NEEDS**

# ROEBLING

## ELECTRIC WIRES AND CABLES



### COMING MEETINGS

- Central Appalachian Section, American Institute of Mining and Metallurgical Engineers: Nov. 20-21, Huntington, W. Va.
- Winding Gulf Operators' Association: annual meeting, Dec. 4, Bair Building, Beckley, W. Va.
- Coal Mining Institute of America: annual meeting, Dec. 10-11, Fort Pitt Hotel, Pittsburgh, Pa.
- Indiana Coal Mining Institute: annual meeting, Dec. 12, Hotel Deming, Terre Haute, Ind.

on an 18½-hour rate and are producing a better foundry coke than when, using no anthracite, they were on a 26-hour schedule. The mixture containing anthracite is charged only into as many ovens as are needed to produce the quantity of foundry coke required by Laclede customers.

**Some Anthracite Adds Strength to Coke**  
—Experiments at Laclede works thus far have shown that anthracite, when used to upgrade coke, must be hard and strong and that its particles must be harder than those of the coals that are to be upgraded. If they are not, when the coke shrinks near the close of carbonization it will not be protected by the presence of anthracite. Good quartz gravel makes stronger concrete than that produced from limestone, for instance, and anthracite particles, being harder than those of the coal mixture, act in somewhat similar manner. When the coal becomes plastic it adheres to the anthracite particles, and the stronger and more porous they are and the greater their surficial area, the greater the possibility of making a strong coke.

Coal from certain parts of the Hazleton district, which is hard, bright and lustrous and breaks with a sharp conchoidal fracture, serves the purpose admirably. The true specific gravity of the coal is about 1.8, whereas in some districts the gravity of anthracite is only 1.5. In full-scale oven tests, Mr. Roberts said, softer varieties proved a complete failure.

Thousands of tons of coal have been coked by his company, using 4 to 5 percent anthracite, asserted Walter Brown, Jones & Laughlin Steel Co. With a fast coking rate, a cross fracture develops which does not show up so much in the shatter test as in blast-furnace operation. Fast time is not suitable for blast-furnace coke.

**How Fine Should Anthracite Be?**—P. H. Haskell Jr., general manager, Alabama By-Products Corp., asked Mr. Roberts if he could explain why minus 100-mesh anthracite was not desirable in the coke charge and why it would not prove as helpful as material of minus 16 mesh and plus 100 mesh. Both he and M. A. Mayers, Coal Research Laboratory, Carnegie Institute of Technology, declared that the finer the uncokable material added, the fewer the fractures in the coke. Coking time had been reduced at his ovens, asserted R. A. Lindgren, Wisconsin Steel Co., to 13½ hours using ovens 16 in. wide.



*Stepping up*  
**DRILLING EFFICIENCY**

**COALMASTER**

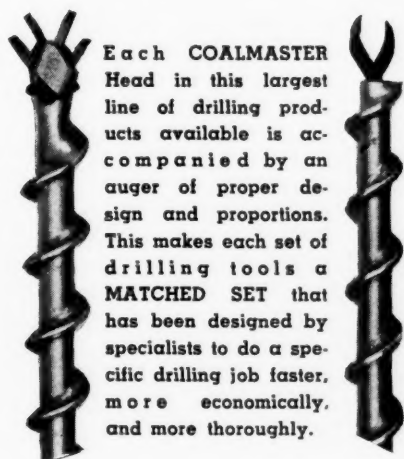
**TOOLS**



Made in sizes from 1 5/8" up, to drill correct holes for all Powder, CARDOX, AIRDOX, hydraulic, and special requirements, COALMASTER TOOLS give you many drilling advantages. Made in types for Hand-held Drills—for Post and Machine-mounted Drills—for Strip Pit Drills.

With COALMASTER TOOLS, your drillers are able to keep the drilling up to schedule more easily and get the necessary time to do a better job. This is because a COALMASTER Matched Tool Set is a combination designed to break up the coal or rock and convey it out of the drill hole with the least effort and in the least time.

Our representatives are specialists in drilling and will gladly confer with you as a means to adding speed and economy to your coal production. Write us if you would like to be called on.

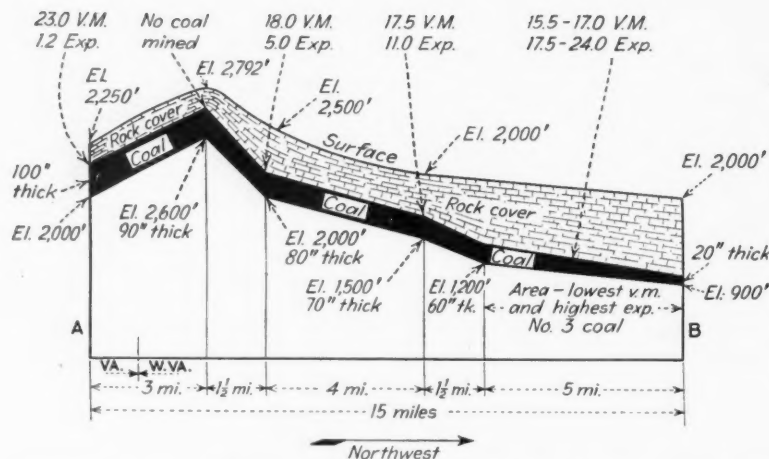


Each COALMASTER Head in this largest line of drilling products available is accompanied by an auger of proper design and proportions. This makes each set of drilling tools a **MATCHED SET** that has been designed by specialists to do a specific drilling job faster, more economically, and more thoroughly.

**CENTRAL MINE EQUIPMENT CO.**

ST. LOUIS, MO.

*"The Drill Bit People"*



Cross-section of No. 3 Pocahontas seam. Bed thins, loses volatile matter and shows maximum expansion on coking wherever cover is greatest. A is a point between Horsepen and Jenkinjones, W. Va., at edge of coal field. B is a point near Caples, W. Va.

C. E. Lesh, president, Pittsburgh Coal Carbonization Co., said that low-temperature coke has been found satisfactory for the uncokable material in the mix. Combined with 40 percent of flue dust, low-temperature coke is hard and strong enough for use in the blast furnace.

With inexpandable dust added to the coal charge, the average size of the coke produced is larger, but the product is less uniform, and the yield of coke between any given two sets of screens is less, asserted Dr. H. H. Lowry, director, Coal Research Laboratory, Carnegie Institute of Technology, which declaration was endorsed by Mr. Haskell, who said that the percentage of braize and of large sizes increases and of middle sizes decreases when uncokable material is added as dust to the charge.

"At Gary," declared A. N. Cole, superintendent, Carnegie-Illinois Steel Corp., Gary, Ind., "we normally carbonize coal mixtures containing 50 percent or more of Pocahontas coals, and the resultant coke being unusually large in particle size and free from shrinkage fissures, our objective was not to increase particle size but to upgrade, into blast-furnace coke, the coke braize of which we had a surplus. No facilities were available for crushing coke braize to the desired size of minus 20-mesh, and the best we could do was to screen out the minus 1-in. coke dust, which, however, contained an objectionable quantity of oversize flakes.

"Even this material added to the coking mixture in various proportions up to 5 percent resulted in marked increase in particle size, reduction in shrinkage cracks and shatter loss. Additional crushing of plus 4-in. coke to reduce this to standard size for use in the blast furnace produced a greater quantity of additional braize than had been added to the coal, and for that reason the practice was discontinued."

With Better Coke More Iron Can Be Produced—If, by better coke, the 240 blast furnaces in the United States could be made each to produce 50 tons more iron daily, steel production would increase about 4,000,000 tons annually, declared Mr. Brown. For the Office of the Solid Fuels Coordinator of the War Pro-

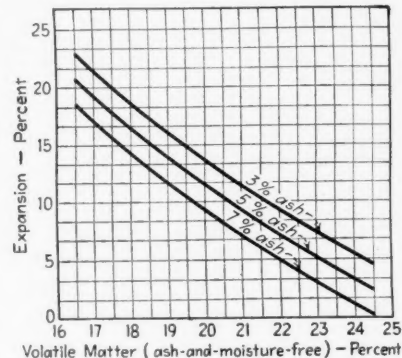
duction Board, Bureau of Mines engineers are surveying these possibilities at every coke and blast furnace in the country.

Burning good coking coals under boilers or in domestic furnaces has no justification, as they are more greatly needed for coke making. These consumers could use medium and high-volatile coals and coals with more ash, sulphur and phosphorus content than would be suitable for the production of blast-furnace coke. The principal seams used for improving blast-furnace coke—Pocahontas No. 3, No. 4 and No. 5, Beckley, Sewell and Lower Kittanning—should be used for that purpose only; this coke should be uniform in size, ash and sulphur.

Coals which expand on coking push against and break the oven walls. Some Pocahontas coals are difficult to control for this reason. Giving due credit to R. C. Tucker and E. T. Heck, West Virginia Geological Survey, Mr. Brown declared that all sections of the Pocahontas measures were pushed northwesterly by an earth movement and, in doing so, one of them developed a break which relieved the pressure, reducing the heat at the points

thus lifted, so that the coal over this area was less metamorphosed and accordingly has a larger percentage of volatile matter than the rest. For this reason it expands less on coking.

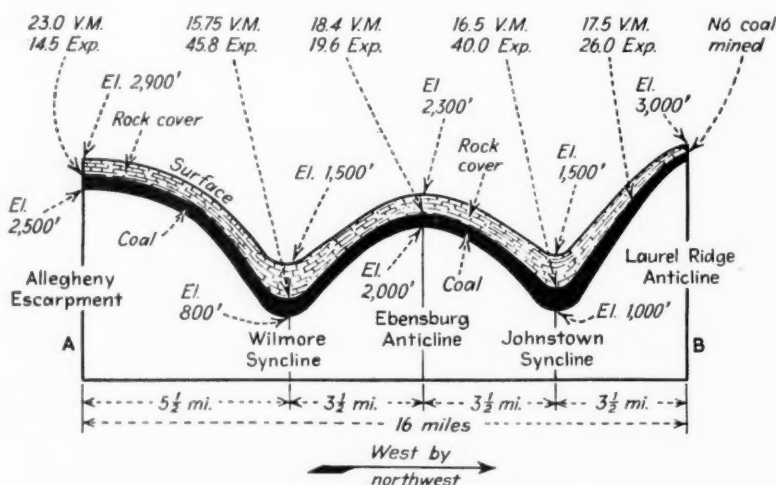
The rule that expansion increases as volatile matter decreases Mr. Brown illustrated also by the Lower Kittanning seam in Pennsylvania where the Allegheny escarpment and the Ebensburg anticline both had higher volatile coal and coal of lower expansion than the Wilmore and Johnstown synclines that, being troughs, were hemmed in and had to endure the push without any relief. The heat thus



Relation between volatile matter and expansion, No. 3 Pocahontas seam.

generated and retained caused the coal to sweat off its volatile matter and thus mysteriously develop its power, when heated, of holding its gases and thereby swelling inordinately. Many good ovens have been ruined because, for a while, no one undertook to study this expansion.

All coals have a certain temperature range within which they produce their best coke. Carbonized at higher temperatures, they develop cross fractures that cause the coke to break on handling and in the blast furnace, thus slowing down the operation of the furnace and burning the tuyeres. When high-volatile coals are carbonized at high temperatures or at a fast coking rate, the tarry vapors cannot decompose and, in consequence, ap-



Cross-section of Lower Kittanning seams. On anticlines, bed thins, retains much of its volatile matter and loses its coking expansivity. A is a point between Astola and Dunlo; B is just northeast of Conemaugh River Gap.

**NEW SUPERLA  
MINE LOADER  
LUBRICANTS**

**LUBRICATION  
ENGINEERING  
SERVICE**

## SUPERLA MINE LOADER LUBRICANTS

**No. 8**—A heavy thickened oil for armature bearings and make-up in cases requiring a leakproof lubricant.

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No. 95 } Provide a range of viscosities  
No. 75 } to meet all loader hydraulic  
No. 41 } system requirements.

Take advantage of Standard's Lubrication Engineering Service. Start by having an Engineer help you test Superla Mine Loader Lubricant. Just write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois, for the Engineer nearest you, or call any Standard Oil office in the Middle West.

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# "E" is for Expert



Whether it's the ABC's or the more complicated angles of Workmen's Compensation insurance you're interested in —

He knows the answers!

For 25 years Bituminous Casualty special agents, auditors, engineers and adjusters have taken pride in their ability to give you and your policyholders a service that pleases.

Bituminous Casualty is the ONE stock company that REALLY WANTS to underwrite your workmen's compensation risks.

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It pays to know the Bituminous!

**BITUMINOUS CASUALTY CORPORATION**  
ROCK ISLAND ILLINOIS

parently they cement the particles together so that fungy coke is formed which breaks when the mass is pushed from the oven or at any time thereafter when the product is handled.

**How to Reduce Spontaneous Combustion**—To be assured of a supply of coal, every plant should have enough for four to six weeks' needs, which coal should be of slack size spread uniformly in layers and then thoroughly compacted with a heavy bulldozer and, if the coal is to be kept in stock for more than six months, the layers should be no more than 2 or 3 ft. thick. To prevent circulation of air through the coal and consequent spontaneous combustion, every 6 or 10 ft. accumulation should be covered with Sisal-Kraft paper (U. S. Patent No. 2,251,321).

**Unsuitable Coal Jeopardizes Iron Production**—Production of the blast furnace depends on the quality of the coke used, declared Mr. Lindgren. The quantity of Pocahontas coal delivered at the Wisconsin Steel Co.'s ovens dropped for a while from 26 to 12½ percent, because coal had to be obtained from a hit-and-miss selection of mines. In consequence, charges hung in the furnace and the tonnage of iron produced dropped 75 tons daily. Uniformity of product is the important factor, asserted both Messrs. Lindgren and Cole, the latter declaring that Pocahontas coal beds Nos. 3 and 4 had widely variant characteristics. Mr. Brown remarked that, for the duration, the smoke ordinance in St. Louis should be lifted because that city was competing with the blast furnaces of the nation.

**Ash Density an Index to Its Performance**—At the afternoon session, R. A. Sherman, Battelle Memorial Institute, presented the paper of R. S. Weimer, general superintendent, Wilmington mine, Northern Illinois Coal Corp., saying that a new criterion, other than ash composition and fusion temperature, was needed for determining the clinkering characteristics of coal ash. Observation of the clinkers formed in furnaces of customers who complained of the severe clinkering of the ash showed that the clinkers were flat, dense and dark. Clinkers from furnaces where the coal was reported to be satisfactory were porous, voluminous and light colored.

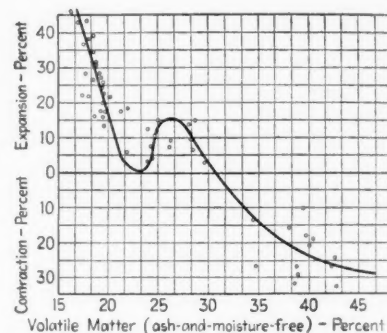
## CLINKERING GRAVITY VARIES

Extensive investigations at the company's laboratories, supplemented by investigations sponsored by the company at Battelle, had developed the fact that the apparent specific gravity of clinkers formed by burning the coal in a furnace where fired by a residential-type underfeed stoker was a satisfactory clinkering criterion. A total of 100 lb. of coal is burned at a rate of about 30 lb. per hour. With various coals, the apparent specific gravity of clinker so formed will vary from 1.5 to 3.5. Coals whose ash forms clinker having a gravity of 2.0 to 2.5 usually will be found suitable for moderate- to heavy-duty underfeed-stoker-fired furnaces. If the gravity is higher, complaints will be received that clinkering is severe. When the gravity is lower, complaints are likely to be made that the coal does not burn fast enough, because the loose, porous ash shields the

furnace bed and prevents rapid combustion.

**Burning Stoker Metal**—No single item in stoker maintenance probably exceeds that resulting from the burning of stoker metal, asserted A. R. Mumford, Combustion Engineering Co., for in the well-designed stoker, wear usually is not abnormally high. Air-cooled surfaces cannot protect adequately all parts of the stoker, and it is customary to depend on an insulating layer of ash or fuel for that protection. Enough air to remove the heat from all parts of the metal as fast as delivered is essential, and a porous insulating layer must be kept on the fire side so that the flow of heat to the stoker parts will be mitigated by the cooling effect of air admitted for combustion.

**High-Ash Coal Protects Stoker**—Chain-grate stokers move the coal in only one plane and when a coking coal is used on such a stoker, the fuel will form a mat on top of the fire, reducing or cutting off the air and allowing the stoker metal to heat, perhaps excessively. With low-ash



Relation between volatile matter and expansion of Lower Kittanning seam.

coals, not enough ash may be present to protect the stoker and if such parts as the rear shaft are not hollow and water-cooled, they may warp.

Coal segregation and wet coal cause iron burning, high maintenance and also inefficient operation, said A. W. Thorson, assistant to president, Carnegie Institute of Technology. Where the coal in storage is, or has become, wet, the dry portions of the pile can be used first and the wet parts left until dried by natural means. When, from a battery of boilers, there is a demand for less steam, the rating of all of them can be reduced simultaneously; thus no boiler will have to be shut down. When the air entering the firebed is shut off, the stoker iron may become a cherry red. If all the boilers are put on reduced rating, the temperatures of none of the stokers becomes excessive.

**Should Market Dust From Coal Separately**—As the purpose of removing the dust from coal is to obtain a better prepared and more salable product, it seems illogical, declared Harmon C. Ray, Carter Coal Co., to return the collected dust to any of the coal being prepared for the market. It should go rather to colloidal fuel plants, briquetters, "sea coal" distributors, water-purification plants and pulverized-coal boilers, the last being perhaps the most practical outlet. The availability

of the size of coal might, however, develop many markets not now in existence. Coal dust can be handled from tank to truck through hose or pipe to the consumers' bins with all the convenience and cleanliness of oil fuel.

Dust is being collected by the Carter Coal Co. from the coal at one of its mines working the Pocahontas No. 4 seam, McDowell County, West Virginia, which is low in moisture, very friable and low-volatile. It is not installed in connection with any washing or cleaning operation but has been established to improve the prepared sizes and to eliminate hazard at the tippie.

**Advantages of Dust Removal and Sale—** Not only does the dust collection increase safety but it removes dust that screening would not eliminate; it recovers tons of dust that otherwise would be distributed over the countryside; it prevents dust from beclouding the tops of the prepared sizes in railroad cars and from settling in the empty cars which are awaiting loads; it receives dust from the vibrating screens that normally finds its way into the small resultant; it removes float dust from the fine slack made in the screening of small stoker-coal sizes, and finally it produces a product consisting of 100-mesh x 0 dust which requires no crushing or further preparation for market.

#### HOW DUST IS SEPARATED

A suction pick-up, cyclone collectors, cloth collectors, a pulverizing mill and a Fuller Kenyon air pump separate the dust. The equipment is designed so that the dust in any of the bins can be circulated by dropping it from the bottom of the bin and pumping it into the bin at the top. Should the fine coal in any bin get hot, this circulation system provides a quick means of cooling it. Also, when the tippie is not in operation, slack coal can be unloaded to a railroad-track hopper, fed to an elevator and discharged to the coarse-dust bin and thence to the pulverizer.

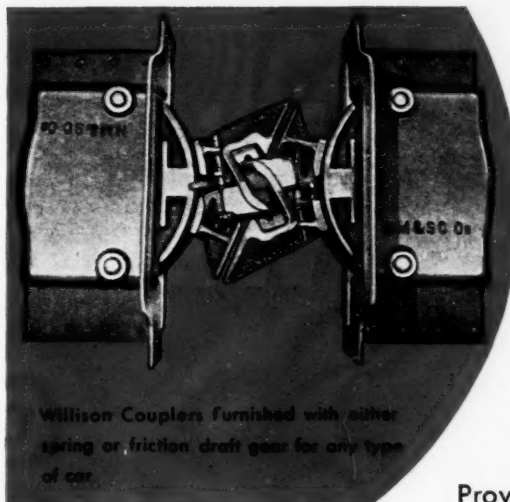
#### PROXIMATE ANALYSIS OF PULVERIZED COAL

	Percent
Moisture .....	0.37
Volatile matter.....	16.35
Ash .....	6.70
Fixed Carbon.....	76.58
Sulphur .....	0.52
B.T.U. per pound as received....	14,590
Ash, fusion temperature.....	2350°F.
Ash, fluid temperature.....	2450°F.

#### SCREEN ANALYSIS

Percent through
200-mesh screen 93.0
100-mesh screen 97.0
60-mesh screen 98.0
40-mesh screen 99.9

**Utility Uses This Dust—**A large utility plant with a new and most modern unit pulverizer system has contracted to use mine-prepared coal dust. Small plants and those without pulverizers or with pulverizers that are outmoded should, it seems, be even more greatly interested in this scheme. Though the dust actually needs no further pulverizing, it was thought well to feed the coal at the utility plant through the unit mill so as to eliminate the expense of further changes in existing equipment and also to pulverize any coarse coal that might find its way into the original



Willison Couplers furnished with either spring or friction draft gear for any type of car.

## WILLISON

### Automatic Couplers

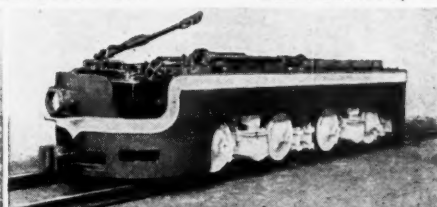
### *Pay Dividends*

1. In Faster Operation
2. In Increased Tonnage
3. In Fewer Accidents
4. Protection to cars thru ample cushioning and reduction of slack.

Proven by more than 10 years of service in several mechanized mines, on cars and locomotives.

Write for Circular No. 5240

NATIONAL MALLEABLE AND STEEL CASTINGS CO. • • • CLEVELAND, O.



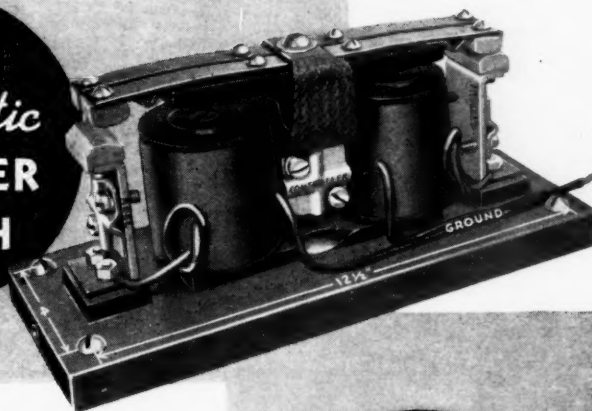
WILLISON Automatic Couplers  
SPEED Mining Operations

## P-G

### Automatic

### TRANSFER

### SWITCH



#### ELIMINATES HAND SWITCHES

It changes the current from trolley to reel automatically, eliminating shocks and burns to the operator. Built for 250 and 500 volts, for either single or double trolley and reel service.

INCREASE  
PRODUCTION  
AND  
PROMOTE  
SAFETY



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221 WEST THIRD STREET, CINCINNATI, OHIO

Defense P

Group 15

Tubing fountain \_\_\_\_\_ length

[§ 114.1 (1)]

(80 M-15-b, as amended, August 25, 1942, effective Sept. 1, 1942)

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- In-process scrap
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- Scrap rubber
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- Inventory
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War order  
Restrictions on consumption  
Crude rubber  
Latex  
Reclaimed rubber

Prohibited products for  
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## HOW WILL RESTRICTING ORDERS AFFECT YOUR BELT REPLACEMENT?

New Government orders restricting the use of rubber and cotton duck are coming so fast that you can't be expected to know all of the rules thoroughly. That's *our* responsibility—ask us.

The U.S. Rubber organization has the experience and technical "know-how" in rubber compounding and belt construction to

provide your mine with the best conveyor belts possible under existing conditions.

Meanwhile, make your present belt wear as long as possible. Our special 44-page booklet "First Aid To Industry In Conserving Rubber" has a special chapter, "How to Lengthen the Useful Life of Belt". Send for your copy.

Priorities [5 144] (2)

described by the Director General  
of Operations. Upon forwarding such  
report, such person may proceed to  
the war order court.

Priorities [§ 114.1 (1)]

Group 2  
Blue coupling rings

Priorities (114) (9)

Actual letter or telegram and not by  
general order) issued prior to 1941

**Cotton**

62,807

Text of Order M-91

Text of Order M-91  
(Title 32, Ch. 9, Part 1094, Code of Federal Regulations)  
5] General Preference Order M-91  
ts have created

[1 62,805] General Preference Order M-91.—WHEREAS, the national defense requirements have created a shortage of cotton duck, as hereinafter defined, for defense, for private account, and for export, and it is necessary, in the public interest and to promote the defense of the United States, to conserve the supply and direct the distribution thereof;

NOW, THEREFORE, IT IS HEREBY ORDERED THAT:

1094.1 **GENERAL PREFERENCE ORDER** (a) **Applicability**  
of Priorities Regulation No. 1.—This Order and all transactions affected thereby  
are subject to the provisions of Priorities Regulation No. 1 (Part 944), as amended  
from time to time, except to the extent that any provision hereof may be incon-  
sistent therewith, in which case the provisions of this Order shall govern.

(b) **Additional Definitions.**—For the purpose of this Order  
 "Cotton duck" shall mean any cotton fabric in duck construction,  
 both inclusive, dyed or proofed state of widths from fifteen inches to  
 yards, in weights and thicknesses with single or  
 yards and single or pilled filling  
 as follows:  
 tent duck and woven awning

# NO REPLACEMENT?

(c) Restrictions on Purchases, Sales and Deliveries of Cotton Duck  
—Except as provided in paragraph (f), and except to the extent necessary to purchase  
sell, deliver or accept delivery of cotton duck to fill orders therefor placed  
with paragraphs (d), (g), (h) or (i), no person shall purchase, sell, deliver  
or accept delivery of any cotton duck in the form of hanks, cones, bales, or

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**¶ 62,805.3**



# UNITED STATES RUBBER COMPANY

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## ROCKEFELLER CENTER

NEW YORK



dust. To make the solid mass of dust flow, a Syntron vibrator is attached to the side of the car which operates until the car is unloaded. A canvas boot connects the car gates and the Fuller Kenyon pump. Thus, the contents of the car are conveyed from the pump to the overhead storage silo. Made in 1939, this installation has given no trouble.

**Percy Nicholls Award**—At the Fuels Conference banquet, the Percy Nicholls Award was presented by Eugene McAuliffe, president of the Institute, to E. G. Bailey "for notable scientific and industrial achievement in the field of solid fuels." Mr. Bailey, vice president, Babcock & Wilcox Co., is the first recipient of this honor, established in memory of Mr. Nichols, who for many years was supervising engineer, fuels section, U. S. Bureau of Mines, and who contributed greatly to the theory and data of combustion. In the war-time operation of our fuel-burning plants, the worst is yet to come, said Mr. Bailey.

For the sake of a little more comfort, a little less work and dirt, many people have transferred their faith in coal to a fuel coming from a source 1,500 miles distant with a definite known supply of about 13 years, and a source which should be under option for the specific use of automobiles, aviation and of Navy and ocean-going vessels. That, to say the least, does not show conservative judgment.

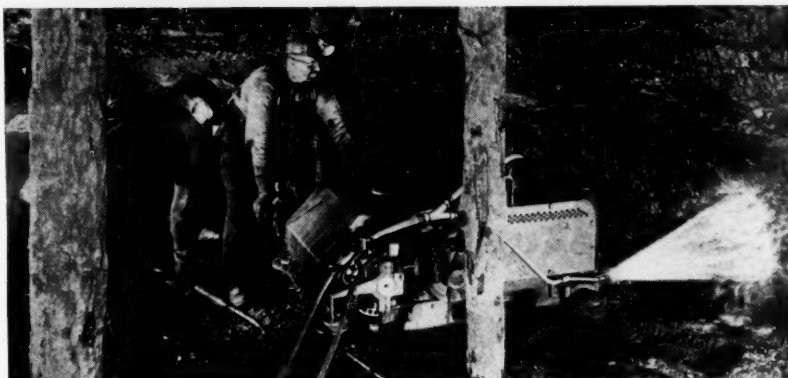
**Burn Coal and Oil Alternately and Together**—The Kansas City Power & Light Co. received inferior coal from strippings in the west central part of Missouri, said H. L. Crain, plant-results engineer. This coal clinkered and heavy slabs of refuse were conveyed to the ash pits, resulting in decreased ratings, high ash-pit loss and low boiler efficiency.

It was decided to use gas bought on an agreement that the gas might be cut off the station at an hour's notice. In extremely cold weather, gas may not be available for two months at a time. The gas burners were placed just above the throat of the combustion chamber, 11 ft. above the stoker; frequently, both gas and coal are burned together. Using gas, the ignition of poor-quality coal is aided, and coking is reduced because the coal can be burned more slowly and the temperature of air delivered to the stoker can be lowered.

**Mix Coal and Oil in Boiler Furnaces**—For marine uses, declared W. C. Schroeder, assistant chief, fuels and explosives service, U. S. Bureau of Mines, oil-coal mixtures have two fundamental advantages over oil alone: (1) Coal is more generally distributed and shipping difficulties may be lessened accordingly, for at least part of the fuel; (2) heat content per unit of volume is 1 to 4 percent greater than with oil alone, thus saving bunker space. In a war, however, adding coal to oil provides ash which leaves a trail, or slick, on the surface of the water. The higher the ash content, the longer the trail is visible and the more easily it may be followed by enemy vessels. Preliminary studies seem to show that coal tar keeps the coal in oil-coal mixtures in suspension better than metal soaps. Fine grinding of the solid fuel stabilizes the mixture but tends



## THE ALL-PURPOSE DUST ALLAYER



- 1 . . . it knocks coal dust out of the air as it leaves the cutting machines and loaders
- 2 . . . it prevents dust from rising in roadways
- 3 . . . it pins dust down at the dump
- 4 . . . it penetrates the finest dust

Compound M readily "wets" the dust with minimum moisture, thus killing it effectively. But Compound M does more. It helps to retain moisture already in laid dust so that it will not rise again. That's why Compound M is so useful throughout the mine. It's the industry's all-purpose dust allayer.

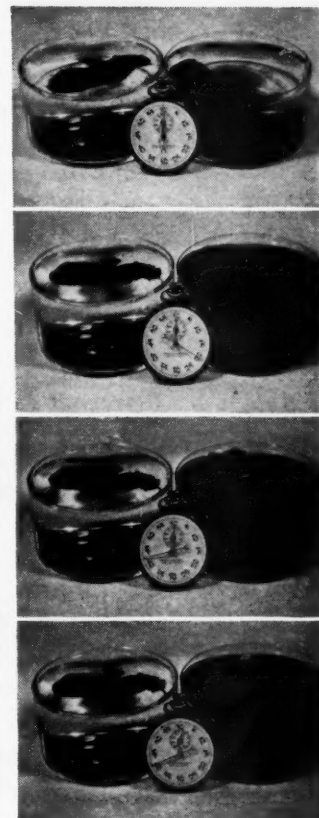
One of the largest operators—with a production around 30,000 tons daily—has standardized on Compound M as its dust-laying agent for all operations. It did so after making many tests. It found Compound M the most effective.

Why not use Compound M to kill the dangerous dust in your mine? Ask for complete technical data.

COMPOUND M is the team-mate of COALADD used extensively for dust-prevention in handling coal outside the mine. Both are products of Johnson-March, an organization specializing in the field of film-forming chemicals for industrial use.

## THE JOHNSON-MARCH CORP.

52 Vanderbilt Avenue, New York, N. Y.



Wetting Power of Compound M  
(left hand receptacle water—right hand receptacle Compound M)



## LABOR IS NO PROBLEM

Labor is no problem when you are reclaiming finer sizes with a PLAT-O Coal Washing Table. The capacity of each table is normally rated at 15 or more tons per hour. Separation is always in full view of the operator and one man can handle 20 tables as easily as he can handle one.

As a result, *one man* can efficiently clean and recover from 300 or more tons per hour, oftentimes from culm banks and other refuse. This statement is not based on "specifications" but by "demonstration." PLAT-O Coal Washing Tables are proving day after day, under a wide range of operating conditions, that fine coal (as small as  $\frac{1}{8}$  x 0) that would be impractical to clean by *any other method* can be effectively and economically reclaimed . . . fast.

Our engineers . . . all specialists in wet gravity separation, are at your disposal . . . contact them today.

**DEISTER MACHINE CO.**  
FORT WAYNE, INDIANA

to increase the viscosity of the final mixture.

**Oil-Coal-Tar Mixtures**—Certain constituents of coal will dissolve in tar, and probably tar also partly dissolves in oil. These actions are favored by increase in temperature, so the stability of oil-coal-tar mixtures might be greatly improved by heating to from 200 to 250 deg. C., as one of Bates' patents indicates.

A system of depolymerizing coal and treating it with hydrogen has been devised by the Japanese, declared Dr. Lowry. By this method the coal is made colloidal. This system is being tested by the U. S. Bureau of Mines, said Dr. A. C. Fieldner. When coal is ground in the presence of oil, continued Dr. Lowry, the mixture is more stable because of the absence of oxygen, which is inimical to stability. When two oils are used, they may destroy one another's effect.

**Is Colloidal Fuel the Answer?**—Why mix coal and oil? demanded John Blizzard, Foster-Wheeler Co.; industry could better continue to use the fuels separately, 30 percent using oil and 70 percent coal. From 45 to 55 percent of coal can be added to oil, but 45 percent is preferable. Agitators should be provided. Use of stabilizers should be avoided.

### FUEL MAY BE ALLOCATED

Because of the war, most coal-burning plants will be required to use coal of a lower grade than customary, and the government may allocate fuel and tell each plant just what kind of coal it can have and how much of it, declared Ollison Craig, engineering manager, Riley Stoker Corporation. Hence, many plants may have to operate with fuel inferior to that previously used and at the same time obtain equal or even greater steam capacity than formerly. They also will have to store coal. Winds sometimes cause air penetration which fires coal piles, and this action has been stopped or retarded by the erection of windbreaks.

**More Stoker Area Needed**—When coal is fired on stokers, it may be necessary, with a lower-grade coal, to increase their area if equal or increased capacity is to be obtained. With chain-grate or traveling-grate stokers, this can be done by increasing stoker and furnace length. With multiple-retort underfeed stokers, area can be increased by adding retorts at the sides and removing the corbeling where the stoker width is less than the width of the boiler. Most multiple-retort underfeed stokers are so constructed that additional underfeed or overfeed areas can be added as desired. With multiple-retort underfeed stokers, an intermittent-dump arrangement can be changed to a continuous ash discharge or clinker grinder that will be equivalent to a lengthening of the stoker, as the area over which coal can be burned as a live fuel bed will be increased.

**Problem of the Little Fellows**—It must be understood, declared Julian E. Tobey, managing director, Coal Bureau, Upper Monongahela Valley Association, that of 8,000 plants investigated operating 15,000 boilers, the average rating was only 174 hp. When talking about improving practice, it is of them we must think and not of the

## KOEHLER FLAME SAFETY LAMP

The Koehler Flame Safety Lamp has two features that insure protection in the mine.

FIRST—Better Ventilation.

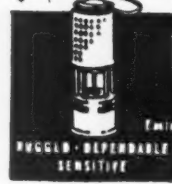
SECOND—Greater GAUZE AREA, for increased sensitivity.

It is rugged, simple and dependable. Will withstand the most constant use and give the most satisfactory service at lowest operating and maintenance cost. The Koehler is as modern as "mechanization" and a "must" in every mine that wants the best in protection.



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Better  
Protection

KOEHLER SAFETY LAMP



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TWINS OF MODERN MINING

WHEAT CAP LAMP







## OUR FLAGS

Old Glory—symbol of our democracy—of the freedom it guarantees—of the goal it struggles toward—of ideals it embodies—of sacrifices, by others, for us. ★ ★ Our Service Flag—our fellow workers, on the battle front. ★ ★ The Minute Man—our share in financial support of their effort. ★ ★ The Army-Navy “E”—awarded the employees of Barber-Greene for efficiency in production. ★ ★ We are proud that machines developed by us for the enrichment of our peacetime way of life, may now serve so effectively in our country’s defense. ★ ★ We of Barber-Greene pledge our continued effort to “keep them flying.”

**BARBER-GREENE COMPANY**

AURORA, ILLINOIS, U. S. A.

*Buy United States*

*War Bonds-Stamp*



**Barber-Greene Bituminous Central Plant**  
*Similar to equipment now being built by Barber-Greene Company for U. S. Army, Corps of Engineers*



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public utilities whose owners and engineers know what should be done and are doing it. The small plants waste fuel, have low carbon dioxide in the flue gases, and not the big plants. In these minor establishments, big improvements are possible.

Overfire air properly introduced, said Mr. Gerschberg, will increase capacity and efficiency, but the problem is where to provide it and how much of it to use. But slagging of the tubes will be increased. With any kind of stokers, overfire air will cut smoke and increase efficiency, asserted T. A. Marsh, national industrial engineer, Iron Fireman Manufacturing Co.

In speaking of "priorities in mine supplies," Mr. McElroy said Great Britain believed she had abundant coal-producing capacity, but today she faces a severe winter shortage. Yet she is normally a far greater coal-exporting nation than we are. If we, in the United States, are not careful, we may have a similar stringency.

**Function of Small Machine Shop in War**—Machine shops can be useful in the war effort (1) by manufacturing war material under subcontracts, (2) by reclamation and repair of equipment parts and (3) by the salvage of such material as is urgently needed by war industries wherever it cannot be repaired or used in the repair of other material, said A. Lee Barrett, maintenance engineer, Pittsburgh Coal Co.

#### SHOULD SEEK REPETITIVE WORK

In subcontracting, mine shops should choose repetitive work that by its volume will repay the expense of making special set-ups by which the several machine tools will be fitted to the jobs they have to perform. They should seek work that, after tooling has been completed, will require only minimum supervision and planning. Production is facilitated if work is chosen on which the required tolerances are not too severe. Much work can be handled by the machines ordinarily found in a small shop, especially if imagination is used in setting up the job.

Highest efficiency can be attained if, for the work to be done, suitable tools, lathe chucks and jigs are designed. Special tools and auxiliary turret tool-holders often can be provided that will enable unskilled operatives to make accurate bores and sizes. Use of tungsten-carbide cutting tools also will speed production.

**Electrical and Gas Welding Reclaim Material**—Reclamation processes are electrical and gas welding, bushing, plating and metallizing. Unless unusual strength is required, material generally can be electrically welded without heat-treatment. In this manner, shafts, chains, sprockets, wearing shoes, quills, worms, etc., can be repaired. With the general-purpose electrode, strengths around 60,000 lb. per square inch may be obtained with an elongation of about 25 percent of the material as welded.

**Metallize for Economy**—With metallizing, or the spraying of molten metal onto worn surfaces, high-carbon materials and high-strength alloys can be built up, without setting up internal stresses. Provided the part is to be finished by grinding, a layer of only a twenty-thousandth of an inch may be applied and machining elim-



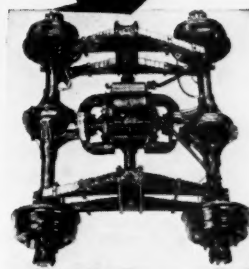
## WHAT A JOB! ALL THAT MEN AND MACHINES CAN GIVE!

Here is an accomplishment that is enough to make the old Sourdoughs turn in their graves. Under the urgency of war the unbelievable is being accomplished in record time. Doing their share is a big fleet of trucks with heavy-duty dump bodies and—

## THORNTON FOUR-REAR-WHEEL DRIVE

You may not be building an Alaskan highway, but you may be building an airport runway or a vital road, or you may be hauling logs or other heavy loads that are essential today. You need **BIG-CAPACITY, HEAVY-DUTY TRUCKS.**

Standard heavy trucks are not available—but don't let that stop you. In the U. S. A. and all over the world 1½ to 3-ton trucks have been converted to husky heavy-duty vehicles that do the job better and cost less. Act quickly while Uncle Sam still approves. Contact your nearest Truckstell-**THORNTON** dealer or wire the factory direct. Trained men will engineer this equipment right to your **PARTICULAR JOB.**



Put **TWO** driving axles under the load instead of one, double the gear speeds, improve springing and load flotation, gain vastly superior tractive ability.

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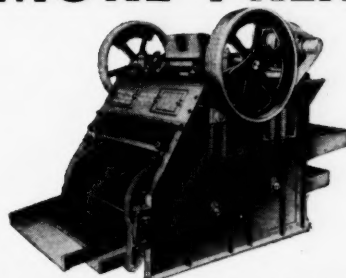
Manufacturers also of the **THORNTON** automatic-locking DIFFERENTIAL  
"When you need **TRACTION** you need **THORNTON**"

## MORE PREMIUM SIZES

WITH  
**AT LEAST 30% LESS FINES**

Patented Vertical Pick Breaker reduces medium size lump to egg or nut. Type B illustrated with shaking feed. Type A equipped with conveyor feed.

**PROMPT SHIPMENT CAN BE MADE**



**M'NALLY PITTSBURG** MFG. CORP.

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL  
Main Office and Works General Sales Office Eastern Office  
Pittsburg, Kansas 307 N. Michigan Ave., Chicago Koppers Bldg., Pittsburgh, Pa.

**SEND FOR LATEST BULLETIN**



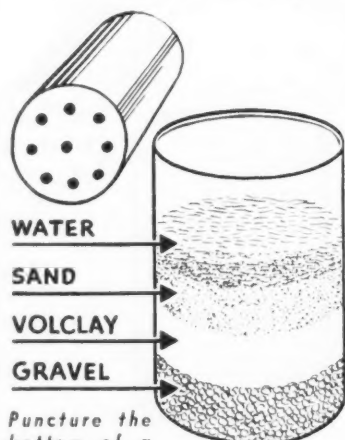
## From 30,000 g.p.m. to a trickle! . . . .

It takes more than a "finger in the dike" to stop a leak *that* size, but VOLCLAY did it. Here's what the engineer said: "This unusual clay (VOLCLAY), with its great swelling property, after being forced under pressure into the voids of the sand seams, seems to have won the battle." Subsequent events proved this to be true.

Whatever your water problem in the mine, Volclay may be the answer. Volclay is an inexpensive natural clay, possessing most unusual physical characteristics which make it ideal for:

- Sealing leaky bulkheads, cofferdams, old bore holes
- Grouting fissures and cracks
- Stopping leakage from concrete reservoirs
- Reducing seepage through earth-lined ditches, ponds, dams
- And most other water sealing problems in mine operation

Volclay works because it swells. Send for a free sample and observe its action in this simple test.



Puncture the bottom of a can with a number of holes to make a sieve and cover the bottom with an inch of gravel or coarse sand. Water will flow through freely. Now cover the sand or gravel with 1/2-inch of KWK VOLCLAY and put a layer of sand over it. Fill with water. It will not penetrate.

Write us about the conditions under which excess water enters your mine. Our engineers will be pleased to recommend a practical application of VOLCLAY to stop the inflow.

- Used successfully by coal mines —anthracite and bituminous

**AMERICAN COLLOID CO.**  
363 W. Superior St. Chicago, Ill.

inated. A cast-iron or bronze pump casing may be lined with stainless steel, and carbon-steel shafts subject to corrosion may be coated in the same manner or with bronze. Such a small quantity of material normally is used that the cost is quite low and the saving of strategic metal is unusually high. Metallized material is porous and absorbs lubricant, making it a good bearing surface.

**Heat-Treatment and Electrodes**—The low cost of available repair parts hitherto has discouraged the making of welded repairs whenever heat-treatment has been required, but such treatment now appears to be a promising opportunity for saving at one blow both strategic material and cost.

**Flame Hardening**—Welded parts may be flame-hardened but 0.30 to 0.50 percent of carbon in the steel is needed for best results. The steel is heated locally by a special acetylene torch and then quenched locally with fine water jets. Such treatment can be applied to welded shafts, bearing fits, worms, sprockets, quills or other wearing surfaces. The cost is low and life frequently may be doubled or tripled thereby.

## Equipment Men Prominent In Lincoln Welding Study

Coal mining equipment men figured prominently in the awards announced Oct. 6 in the 21-year scientific welding study program sponsored by the James F. Lincoln Arc Welding Foundation, Cleveland, Ohio. The contest brought forth reports of welding progress prepared by executives, engineers, designers, production officials and others throughout the industrial field. The study indicated a possibility of tremendous savings in costs and man-hours in turning out products by arc-welding for both war and peace.

Chief awards in the coal-mining field were:

George W. Mork and Howard Squires, engineer and manufacturing engineer, respectively, Bucyrus-Erie Co., South Milwaukee, Wis., for a redesign by which structural members were butt welded to small high-production castings, in producing a bullgrader main frame at a reduction in cost (\$500).

G. Johanson and E. Korensky, engineers, Link-Belt Speeder Corp., Cedar Rapids, Iowa, and C. H. Nielson and H. N. Ekbohm, engineer and chief engineer, respectively, Link-Belt Speeder Corp., Chicago, for change in design of a crawler-excavator and crane from a cast and riveted unit to an all-welded design (\$250).

Eugene A. Balsley, Chicago, for showing influence of arc-welding on a power drum; a clean brake surface is necessary to permit a reasonable length of brake-lining service (\$150).

Harry A. Roe, principal designer and chief engineer, Saurman Brothers, Inc., Chicago, for design for a scraper-loader (\$150).

Scott Van Etten, part owner and superintendent, Reliable Machine Works, Columbus, Ohio, for a small low-cost coal-mining undercutting machine to operate in

low-vein coal mines where standard equipment is too costly or too large (\$100).

M. Earl Lohr, planning engineer, piece-rate department, Bethlehem Steel Co., Johnstown, Pa., for arc-welded narrow-gage cars (\$100).

R. A. Beckwith, vice president and chief engineer, Koehring Co., Milwaukee, Wis., for completely welded crawler frame for power shovel or crane (\$100).

E. W. Taylor and Herbert T. Kranz, vice president and bucket engineer, respectively, Industrial Brownhoist Corp., Bay City, Mich., for redesign of arms for clam-shell buckets (\$100).

John D. Russell and Samuel Leven, electrical engineer and designing engineer, respectively, Joy Mfg. Co., Franklin, Pa., for arc-welded cable reel (\$100).

## Personal Notes

FRED J. BAILEY, general safety inspector, Koppers Coal Division, Eastern Gas & Fuel Associates, has joined the U. S. Bureau of Mines, Mineral Production Security Division, Pittsburgh, Pa. He had been associated with Koppers 14 years, seven as foreman and seven as safety inspector. He is past president of Post No. 1, Smoke Eaters, Welch, W. Va.

ANGUS R. BROWN, superintendent of ventilation, Tennessee Coal, Iron & Railroad Co., coal mining division, has been awarded the company's gold medal for 50 years of service.

WILLIS R. DEVENS, transitman, Glen Alden Coal Co., Scranton, Pa., has been appointed ventilation engineer, vice H. Merton Ruth, promoted.

FRANK EFANT, a mine foreman for the Consolidation Coal Co., Jenkins, Ky., resigned his position late in September to accept a similar position with the West Virginia Coal & Coke Corporation at Omar, W. Va. He was with Consolidation for many years.

W. W. EVERETT, assistant general superintendent and assistant to the general manager, Glen Alden Coal Co., Scranton, Pa., has been advanced to acting general superintendent. He succeeds GREYSON P. TROUTMAN, who has been granted a leave of absence because of illness.

GEORGE GUINEY has been appointed superintendent of Mine No. 7, Franklin County Coal Corp., Royalton, Ill., vice Byron Brown, deceased.

F. L. KLIPPLE, superintendent of Wanamie colliery, Glen Alden Coal Co., Wanamie, Pa., has been named assistant general superintendent, vice W. W. Everett, promoted.

THOMAS MOSES, Danville, has been appointed by Governor Dwight H. Green as a member of the Illinois Mining Investigation Commission to fill the vacancy caused by the resignation of A. H. Truax. Mr. Moses, who formerly was president of the H. C. Frick Coke Co., was named to represent the coal-mine operators on the commission.



WILLIAM M. NEAL has been elected vice president and secretary of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala. He formerly was assistant treasurer and secretary.

H. R. PLOMMER, general manager, Canadian Collieries (Dunsmuir), Ltd., Nanaimo, B. C., has been appointed to the Canadian National Manpower Advisory Committee as representative of the coal industry.

M. E. PRUNTY has been elevated to superintendent of Mines 204, 206 and 207 of the Consolidation Coal Co., vice Raymond C. Denny, who recently became general manager of the West Virginia Coal & Coke Corp.

H. MERTON RUTH, ventilation engineer, Glen Alden Coal Co., Scranton, Pa., has been made superintendent at Wanamie colliery, vice F. L. Klipple, promoted.

H. F. SAGOCI has been appointed instructor in mining engineering at Lafayette College, Easton, Pa. Prof. J. W. Stewart resigned on Oct. 1 to become assistant professor of mining engineering at the University of Illinois, Urbana. Mr. Sagoci received his S.B. degree in mining engineering at Massachusetts Institute of Technology in 1940 and was awarded the degree of S.M. in mathematics there in 1942. He is a candidate for the degree of Sc.D. in geophysics at the same institution.

J. D. SNYDER, JR., Jenkins, Ky., has been named as superintendent of No. 214 mine of the Consolidation Coal Co., McRoberts, Ky. He is the son of J. D. Snyder, Sr., general manager of Consolidation.

L. NEWTON THOMAS, president, Carbon Fuel Co., Charleston, W. Va., was elected president Oct. 15 of the Kanawha Coal Operators' Association. DUNCAN C. KENNEDY was reelected executive secretary. EDWARD R. BURKE, president, Southern Coal Producers' Association, spoke at a banquet climaxing the meeting, at which Homer A. Holt, former governor of West Virginia, was toastmaster.

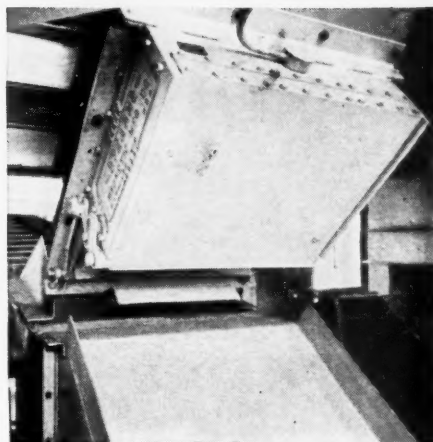
#### Keystone Coal Manual Ready

Keystone Coal Buyers' Manual for 1942, 24th edition, is now off the press. Established in 1916, this is a compilation of facts on who mines and who sells United States and Canadian bituminous and anthracite coals. The first directory of the coal industry issued since our entry into the war, it shows thousands of changes dictated by the war effort.

Listed are 2,178 bituminous and anthracite companies and 2,559 mines all with a capacity of 100 tons per day or more. More than 300 operating companies have been added; over 350 deleted. More than 25,000 changes have been made in detailed data referring to personnel, equipment, sales agencies, etc.

In recognition of the growing importance of cleaned and treated coals, there has been added an entirely new data sec-

# Stearns Spout MAGNETS PROTECT against TRAMP IRON



A typical Stearns Spout Magnet installation and the resulting accumulation of tramp iron from several days' operation. And—the scrap metal recovered helps substantially toward paying for the magnetic equipment.

In this age of mechanization, tramp iron and metallic junk in your coal flow can be efficiently, automatically and economically removed with Stearns Magnetic equipment.

Our many years of pioneering experience in designing magnetic equipment for the coal industry enables us to be of profit-

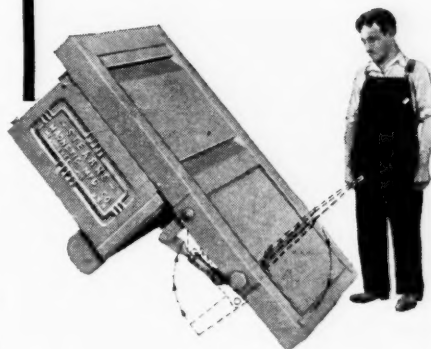
able assistance in controlling your tramp iron problem.

Cost is negligible compared with the definite results obtained. It will pay you to investigate Stearns Magnetic methods. Let us show you how Stearns magnets can be put to work for you.

Write for Bulletin 97 on Stearns Spout Magnets; Bulletin 302, Stearns Magnetic Pulleys; Bulletin 25, Suspended Magnets.

Stearns Engineers are well qualified to advise you.

Ask for our recommendations. No obligations.



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MANUFACTURING CO.**  
661 S. 28th St., Milwaukee, Wis.



### Osmose-treated ties cut replacement costs and help prevent accidents

Because untreated ties previously decayed within a few years, thereby necessitating frequent costly replacements, a prominent Southern mining company\* investigated and installed Osmose-treated ties. Careful records proved that the Osmose-treated ties lasted 3 to 5 times longer than the untreated ties thus cutting replacements and costs by as much as 300 to 500%. Rail spreading with resultant accidents was also minimized because of sounder wood structure around the rail spikes. Today, this company, as well as many other mining companies, uses Osmose-treated ties and timbers exclusively. Our field engineers will gladly assist you in solving your wood-preserving problems. Write for Bulletin 142-C, today.

\*Name on request.

## OSMOSE WOOD PRESERVING COMPANY OF AMERICA INCORPORATED

General Offices: Buffalo, N. Y.—Branch Offices: Birmingham, Ala.; Denver, Colo.; Harlan, Ky.; Kenova, W. Va.

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### OSMOSE

#### PROTECTION PAYS

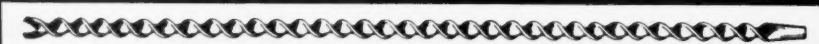
**1. APPLICABLE** to fresh cut native timber locally obtained and treated thus eliminating or reducing transportation costs to minimum.

**2. PENETRATES** deeply into the timber providing 3 to 5 times longer service life over untreated wood.

**3. ECONOMICAL.** No capital investment in treating equipment required. Eliminates costly transportation to and from mechanical pressure-treating plants.

**4. EASY TO APPLY** by brushing or dipping with unskilled labor. No special expensive equipment necessary.

## HERCULES AUGERS



### HERCULES AUGERS

• The ideal auger for modern high speed electric drills . . . withstands whips and torsional strains. Flint hard and tough as whalebone. Drills faster . . . drills more holes with resharpening . . . outlasts 4 to 5 ordinary drills. Recommended for the hardest jobs. Up to 3" diameters . . . up to 16 ft. in length.

### BLACK DIAMOND AUGERS

• Made from high-carbon crucible grade steel. Carefully heat-treated to obtain as much hardness and toughness as possible, to prevent broken tangs and points. Furnished up to 2" diameters . . . over-all lengths, 16 ft. maximum.

### STANDARD AUGERS

• Originally developed for use with hand drills. These augers work best only at hand drilling, drilling holes under stumps, and ditch blasting. Up to 2" diameters, from oval steel 7/16" thick, and maximum length of 10 ft.

Call on us for any type auger you may require in your operations. We specialize in manufacturing the better grade alloy, heat-treated augers. Write, wire or phone for details concerning sizes, prices, deliveries, etc.

## SALEM TOOL COMPANY • SALEM, OHIO

tion, a "Directory of Mechanical Cleaning Plants," making it easy to ascertain immediately where to obtain washed or air-cleaned coal. Detailed data include type of mechanical cleaning equipment, sizes washed or air-cleaned, type of dust-proofing treatment used, special stoker sizes produced, etc. There also are sections on coal-trade organizations and coal trade names.

### Reports New Methods Burn Anthracite Economically

Improved methods for controlling the burning of anthracite which will save fuel, prevent overheating in mild weather and permit fires to be banked for longer periods are being developed, according to H. J. Rose, in charge of the research program sponsored by Anthracite Industries, Inc., at Mellon Institute, Pittsburgh, Pa. At a meeting of combustion engineers of the principal anthracite producers held Sept. 27 at the institute, Mr. Rose said that the new methods are bringing close to realization research efforts to develop more efficient and convenient results for anthracite consumers. The timeliness of this development was emphasized because of the many home owners, especially in the eastern states, who are changing from oil and gas to anthracite for heat.

The new methods, Mr. Rose pointed out, can be applied readily to existing boilers and hot-air furnaces and, in many cases, may be used with improved results without the need of added attachments. Tests are to be conducted immediately by anthracite industry fuel engineers, in conjunction with Mellon Institute, in a large number of homes under actual field conditions to evaluate the developments in practical use.

### Obituary

BYRON BROWN, 50, superintendent, Mine No. 7, Franklin County Coal Corp., died at Herrin, Ill., Sept. 17 after a lingering illness. He was with this company and its predecessor for about 30 years.

JOHN LEE, mine foreman, and LUTHER THOMPSON, assistant foreman, were killed in an explosion Oct. 3 in the Alva mine of the Black Star Coal Corp., Alva, Ky.

WILLIAM S. LOVELL, 79, for many years president and operating head of the Montevallo Coal Mining Co., and later chief clerk of the U. S. District Court for Northern Alabama, died Oct. 4 in Birmingham.

CHARLES J. ALBASIN, 73, for many years commissioner for the Ohio Coal Association and former president of the Eastern Ohio subdistrict of the United Mine Workers, died Sept. 29 at Brookside, Ohio.

W. R. YOUNG SR., 65, president, Blocton Mining Co. and Hills Creek Coal Co., West Blocton, Ala., died Oct. 20 in a Birmingham (Ala.) hospital. He had been active in the coal mining industry in Alabama for about 40 years.

## Transportation the Subject At Mining-Electrical Meet

Transportation was the subject of the Oct. 1 meeting of the Mining-Electrical Group of Southern Illinois, held at the West Frankfort Country Club. Officers for the ensuing year were chosen as follows: president, Hector Hall; vice president, John E. Giles; secretary, Paul Kirk; treasurer, Arthur Reiger.

"Allies of Transportation" was the subject of an address by P. H. Haskell, sales manager, West Virginia Rail Co., Huntington, W. Va., who declared that "perhaps no word has a larger place in the thoughts of mankind today than allies. To obtain the best of results, the correlation of all physical and mechanical allies must be complete. Transportation has long been a problem of mankind. Man's desire to move goods has always surpassed his ability to carry them, or, as is commonly said in West Virginia, 'To tote 'em.'"

Tracing the evolution of mine transportation in the United States, Mr. Haskell pointed out that among the allies necessary for a modern, well-planned transportation system are: A well engineered shaft bottom, good track, good rolling stock, efficient electric power distribution and a train-dispatching system.



Hector Hall (left), new president, and Paul Kirk, secretary. Mr. Hall is chief electrician, Zeigler No. 2 mine. Mr. Kirk holds a similar position with the Seymour Coal Mining Co.

Literally and figuratively, he contended, trackwork is the foundation for transportation. The type of trackwork in a mine has a pronounced influence on the efficiency of its electrical equipment. Bonds should be applied so that the electrical conductivity is as high as possible and so located as to be free from mechanical injury due to derailments. Although ratios as high as 12 to 1, and as low as 8 to 1 are used, a ratio of 10 to 1 for the conductivity of copper and steel is generally agreed on. Thus a bond may be chosen that will not increase joint resistance.

The design, construction and maintenance of track has a direct mechanical

## WORN TRACTOR ROLLERS *Outlast* NEW ONES

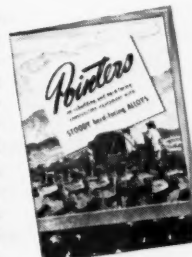


### WHEN REBUILT WITH STOODY SELF-HARDENING

Now that deliveries on replacement parts are slow and down time is so costly, contractors are salvaging worn tractor rollers and other tractor parts by hard-facing with Stooddy Self-Hardening.

This hard-facing alloy, because of its hardness and toughness, forms deposits that are decidedly more wear resistant than the original steel. Tractor rollers rebuilt with "Stooddy Rod," therefore, outlast new unprotected rollers two to one, and in many cases the ratio is even higher. Furthermore, the hard-facing operation can be repeated as often as necessary. For this reason tractor parts that were formerly scrapped after a few weeks service can now be made to last months and even years. 3 16" and 1 4" diameter Stooddy Self-Hardening for electric application is priced at 50c per pound, f.o.b., Whittier, California. Prompt deliveries are currently being made on orders carrying ratings of AA-4 or higher.

Stooddy's new 16-page folder, "Pointers on Rebuilding and Hard-Facing Construction Equipment" explains procedures for rebuilding tractor parts and other types of construction equipment with Stooddy alloys. To obtain your copy, just fill in and mail coupon.



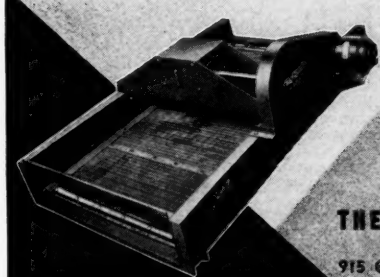
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Rugged Leahy screens help you meet increased wartime demands by giving you maximum returns . . . more accurate sizing . . . quicker make-ready and replacement of jackets. They cut operation costs, too, through low initial cost and upkeep . . . lower power consumption . . . and many labor-saving features.

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● In these days coal production must be kept at a maximum, and from a profit standpoint, if you can't get the power you pay for at the face, you're wasting money every hour of production. It isn't the power you pay for at the face that counts, it's the power you get at the face. MOSEBACH FLASHWELD RAIL BONDS will protect you from power loss and will turn POWER into PROFITS. The patented Flashweld Process, gives greater welded strength, less resistance and longer Bond Life.

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Likewise the purchasing of hoisting equipment to help keep your war materials moving is a serious matter. Specify the hoist with the safety valve handle; the hoist that will operate in any position, horizontally or vertically, or either end up—the Coffing "Safety-Pull" Ratchet lever hoist—and you will have the most useful lifting or pulling tool available.

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Ratchet Lever, Spur Geared and  
Electric Hoists

800 WALTER ST. DANVILLE, ILL.

effect on all electrical equipment and an important effect on haulage loads. Low joints that "go from bad to worse" sabotage transportation.

Long, easy curves, properly widened and with the outer rail correctly elevated will smooth out traffic troubles and reduce unnecessary electric loads. Heavy rails on well-ballasted, well-drained roadbed will produce results in mines as well as on trunk-line railways. The American Mining Congress has a booklet of mine track data. Its use will help solve these problems.

### Coal-Mine Accident Fatality Rate Reacts Sharply

Accidents at coal mines of the United States caused the deaths of 95 bituminous and 11 anthracite miners in August last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 47,160,000 net tons, the accident death rate among bituminous miners was 2.01 per million tons mined, compared with 2.09 in August, 1941.

The anthracite fatality rate from accidents in August last was 2.12, based on an output of 5,180,000 net tons, against 5.34 in the eighth month of last year.

For the two industries combined, the accident fatality rate in August last was 2.03, compared with 2.42 in the corresponding month a year ago.

Fatalities during August last, by causes and states, as well as comparable rates for the first eight months of 1941 and 1942, follow:

#### DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS\*

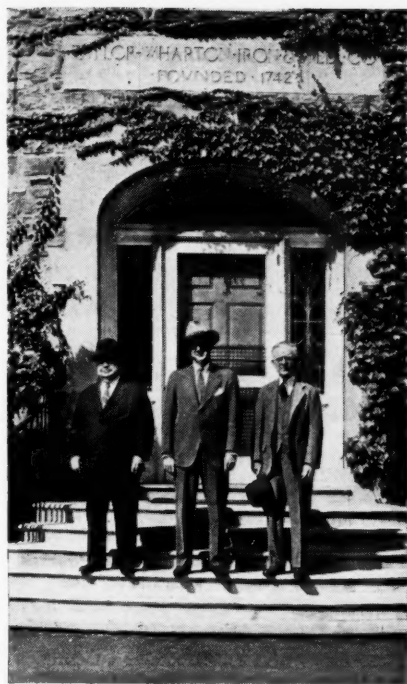
January-August, 1941 and 1942

	Bituminous				Anthracite				Total			
	Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons	
	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942
Underground:												
Falls of roof and coal...	361	381	1.146	1.002	76	95	2.118	2.373	437	476	1.246	1.132
Haulage...	119	142	.378	.373	21	23	.585	.574	140	165	.399	.392
Gas or dust explosions:												
Local...	15	5	.048	.013	5	5	.139	.125	20	10	.057	.024
Major...	43	121	.137	.318	...	...	...	...	43	121	.123	.288
Explosives...	15	12	.048	.032	12	9	.334	.225	27	21	.077	.050
Electricity...	21	35	.067	.092	4	4	.112	.100	25	39	.071	.093
Machinery...	21	28	.067	.073	...	...	...	.025	21	29	.060	.069
Shaft...	2	3	.006	.008	2	2	.056	.050	4	5	.011	.012
Miscellaneous...	9	22	.028	.058	9	9	.251	.225	18	31	.051	.074
Stripping or open-cut...	14	15	.044	.039	2	2	.056	.050	16	17	.046	.040
Surface...	29	31	.092	.082	10	7	.279	.175	39	38	.111	.091
Grand total...	649	795	2.061	2.090	141	157	3.930	3.922	790	952	2.252	2.265

\* All figures subject to revision.

#### UNITED STATES COAL-MINE FATALITIES IN AUGUST, 1942, BY CAUSES AND STATES

State	Underground						Open-Cut	Sur-face	Grand Total
	Falls of Roof	Falls of Face	Haulage	Electricity	Machinery	Other Causes			
Alabama...	...	...	1	...	...	...	...	...	1
Arkansas...	2	...	...	...	...	1	3	...	3
Colorado...	2	...	1	...	...	...	3	...	3
Illinois...	2	2	2	1	1	1	9	2	11
Indiana...	1	...	...	...	...	...	1	...	1
Iowa...	2	...	...	...	...	...	2	...	2
Kentucky...	6	2	2	2	1	...	13	...	13
Maryland...	...	...	...	1	...	...	1	...	1
Montana...	1	...	...	...	...	...	1	...	1
Ohio...	3	...	2	...	1	1	7	...	7
Pennsylvania bituminous...	5	...	5	...	...	...	10	2	13
Tennessee...	1	...	...	...	...	...	1	...	1
Utah...	1	...	...	...	...	...	1	...	1
Virginia...	5	...	...	1	1	1	8	...	8
West Virginia...	15	1	6	2	1	...	25	1	26
Wyoming...	2	...	...	...	1	...	3	...	3
Total bituminous...	48	5	19	7	6	4	89	2	95
Pennsylvania (anthracite)	4	2	3	1	...	1	11	...	11
Grand total...	52	7	22	8	6	5	100	2	106



General office of Taylor-Wharton Iron & Steel Co., High Bridge, N. J., erected more than 100 years ago. Left to right: L. N. Aller, treasurer; George R. Hanks, president, and Charles B. Andrews, assistant to the president.

#### Taylor-Wharton Company Starts Third Century

Taylor-Wharton Iron & Steel Co., High Bridge, N. J., celebrated its 200th year in the iron industry and the 50th of making Hadfields manganese steel on Oct. 7 with quiet ceremonies in which representatives of the Army and Navy took part. The company was founded by William Allen, later a member of the Philadelphia Common Council, a member of the Pennsylvania Provincial Assembly, Mayor of Philadelphia and Chief Justice of the Supreme Court of Pennsylvania, and Joseph Turner, also subsequently a member of the Philadelphia Common Council and of the Provincial Assembly.

Robert Taylor, who became bookkeeper for the firm about 20 years later, took active charge when the founders began to slow up from old age, and continued in charge after their deaths. In 1803 he purchased control of the company and was followed by four generations of Taylors as heads of the company. George R. Hanks now is president.

#### New Zealand Government Runs Waikato Mines

Regulations taking over the important Waikato coal fields for the duration of the war under directorate of government representatives, owners and workers have been issued by the New Zealand Government. The miners' union has given its approval. The army is releasing hundreds more miners to expedite coal output, Labor Minister P. G. Webb disclosed. Priorities have been granted on materials for constructing new homes in mining regions.

## Portable's CAP LAMPS...

Are increasing production efficiency for the  
**DAVIS COAL & COKE COMPANY**

• The Davis Coal & Coke Company, large coal producers in Maryland and West Virginia, knew they must have light that they could depend on for efficient operation in their mines. That's why they have installed 250 PORTABLE CAP LAMPS at their Kempton #43 mine, 125 PORTABLE CAP LAMPS at their Pendleton #39 mine and 100 PORTABLE CAP LAMPS at their Pendleton #23 mine.

Unlike some lamps, PORTABLE CAP LAMPS supply just as much light year after year as they do the first day they are installed. Battery efficiency is GUARANTEED never to drop below 80% of rated efficiency.

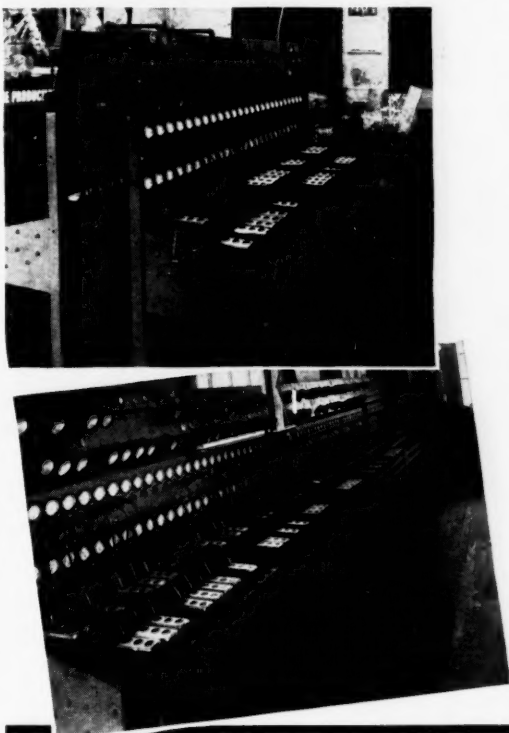
Take a tip from the Davis Coal & Coke Company... make sure your men have all the light they need by installing PORTABLE CAP LAMPS in your mine.

Write for complete information.



Above — Installation of 100 PORTABLE CAP LAMPS at the Davis Coal & Coke Company's Pendleton Mine #23 located at Thomas, West Virginia.

At left — Installation of 125 PORTABLE CAP LAMPS at the Davis Coal & Coke Company's Pendleton Mine #39 located at Pierce, West Virginia.



## THE PORTABLE LAMP & EQUIPMENT CO.

72 FIRST AVENUE



PITTSBURGH, PENNSYLVANIA

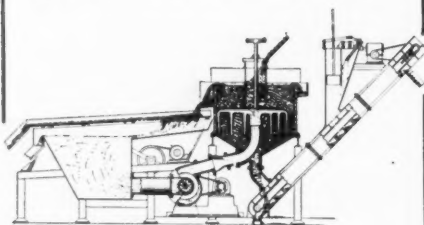
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General Offices: HAZLETON, PA.  
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**AMERICAN DOORS**

Control air circulation for prevention of gas accumulation. American Mine Doors save trapper boy expense, maintain trips at continuous high speed, combine safety with big savings. Write for complete catalogue for full information.

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MINE DOOR COMPANY**

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## Calcium Chloride Research Initiated at Battelle

An extensive program of research on the treatment of coal with calcium chloride to reduce dust in handling and to avoid difficulty brought about by the freezing of wet coal has been initiated at Battelle Memorial Institute, Columbus, Ohio, under the joint sponsorship of the Calcium Chloride Association and Bituminous Coal Research, Inc., according to an announcement on Sept. 30 by Clyde E. Williams, director of Battelle.

Although experience with the use of calcium chloride has been extensive, Mr. Williams noted that information is lacking on the exact quantities to be used for most effective treatment of coals of various ranks and sizes and on the best methods of application. The research program is to be directed toward obtaining complete and authoritative information on these points.

Battelle's research program will supplement and be correlated with a program that the Calcium Chloride Association has carried on for four years and is continuing at West Virginia University, Morgantown, under the direction of Prof. W. A. Staab.

## Illinois Strip Commission Completes Work

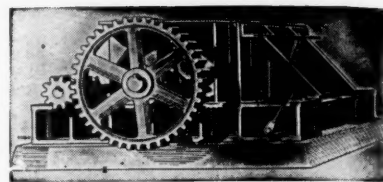
Hearings in an investigation of strip mining by a commission authorized by a law enacted by the Illinois Legislature in July, 1941, were completed in sessions late in September at Pinckneyville, Ill. The commission consists of ten people, three from each branch of the Legislature, two coal operators (Harold Hicks and Hubert E. Howard) and two coal miners (Charles Brosch and Al Pruessing).

The hearings were stated to have developed a large amount of factual information of value to the coal stripping industry and to the public. Much of this data was from the files of the Geological Survey and the Forestry Department of the State of Illinois. Most of the remainder was from authoritative sources within the stripping industry of Illinois or county records. Taken all in all, the information is very complete and is filed with the commission in the form of maps, tables and descriptive matter.

The geology of the strippable areas of southern Illinois was presented by G. H. Cady at the Pinckneyville sessions, while taxation was discussed by James H. Bristow, secretary, Illinois Coal Strippers' Association, and a Harrisburg attorney. Of 40,000 acres acquired by strip-mining companies in the southern Illinois six-county area, 24,000 acres is minable by stripping. Of this acreage, 9,590 acres has been mined to date, producing approximately 6½ million tons annually and putting into circulation that many dollars locally. Taxes amount to \$2.40 an acre, based on the acreage underlain with minable coal and including the personal property used for mining operations. Adjoining farm land taxes are 44 c. per acre, including improvements. These are average figures. Actual valuations in individual counties vary.

Strip-mining companies have planted

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With this advanced design, in rugged STEELBUILT construction, far more accurate sizing is possible to meet Code requirements through quick adjustability, in a range from ¾" to 8".

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Seven (7) sizes afford a capacity range from 50 to 1000 tons per hour.

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BRADFORD BREAKERS, BRADMILLS,  
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PUT YOUR COAL PREPARATION PROBLEMS  
UP TO US.



Liberty Trust Bldg. Philadelphia  
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more than 7,000,000 forest trees on stripped-over lands, under a united program to reforest each year, since 1938, the acreage mined the previous year. Slightly more than half these trees were planted in the southern section of the State—below the latitude of St. Louis. It was stated 1,200 trees per acre are planted to get a final stand of 300 or 400; that the cost of planting is \$12 to \$20 per 1,000, and that trees grow better on spoil land than on the original surface soil. Illinois produces but 2 percent of its timber requirements at the present time. This subject was presented by L. H. Kahler, Division of Forestry, Illinois, and by the forester of one of the strip-mining companies.

Based on the actual leveling of 41.82 acres of stripped land for a mine haulage road, approximately \$3,000 per acre was given as the cost of leveling stripped areas having conditions comparable to the reporting company. By far the larger part of the cost is moving the spoil from the box cut across country to the final open cut. In this case total cost would work out to be 44.7c. per ton for the coal removed. The cost of equipment to carry leveling along with the stripping is estimated to approximate \$350,000. Additional men would be a 25 percent increase over the men now employed at the mine.

The inquiry failed to develop, at any hearing, the expected antipathy to the industry, or a demand for punitive legislation. The testimony of Mayor Stump of Pinckneyville indicated his community was much more interested in the steady em-



ployment, superior schools and stable business conditions that strip mines had brought about than preserving the scenery of the none too prosperous flat farming areas of southern Illinois.

### Consol Team Retains Honors As First-Aid Champion

A Consolidation Coal Co. team from Jenkins, Ky., holds its second State first-aid championship, won Oct. 3 at Lexington, Ky., in competition with 17 other teams. The defending champions, who won their first title last year, expertly administered first aid to "victims" injured in mythical mine disasters. The team was composed of Captain Blaine Sexton, Bramble Davidson, Henry Horner, J. C. Correll, Raymond Wetzell, and the "victim," James Wood. The company's safety director is Frank Correll.

Four teams tied for second place with 17 minus points each. In solving a run-off problem they ranked as follows: second, Algoma Block Coal Co., Lothair, Captain Clyde Franks; third, Blue Diamond Coal Co., Bonnyman, Captain H. B. Lynch; fourth, Columbus Mining Co., Allais, Captain Sherrill Pfoff.

The Consolidation and Algoma teams were awarded loving cups and district winners' banners, Algoma placing first in the Hazard field. Other district winners were: Crescent Coal Co., Central City, Captain Ward Padgett, western Kentucky; Eastern Coal Corp.'s Mine No. 1, Captain Joe Newman, Pond Creek-Tug River district; Stearns Coal & Lumber Co.'s Mine No. 4, Captain Ned Duncan, Cumberland Valley.

For the first time, a women's team took part in the contest, but the women, a girls' team and a Boy Scout team were not entered in the State-wide title competition. They were awarded merit badges.

The Inland Steel Co.'s Wheelwright mine team, captained by Burman Powell, won the State test for Negro teams and received a cup.

### Princess Dorothy Team Wins

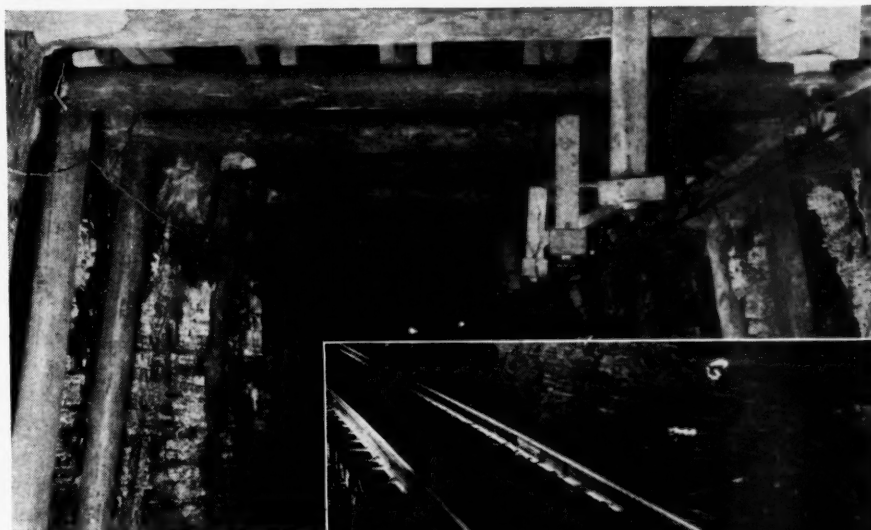
The Princess Dorothy Coal Co. team, of Eunice, W. Va., won top honors at the 17th annual safety meet of the Coal River Mining Institute, held at Madison, W. Va., with 18 teams participating. There also were three girls' teams, one Boy Scout team and one colored team taking part.

### \$75,000 Fire at Blossburg

Fire of undetermined origin completely destroyed the tippie, washery and other preparation equipment at the Blossburg "E" mine of the Brookside-Pratt Mining Co., Blossburg, Ala., Sept. 27. The loss is estimated at \$75,000. The company was able to purchase intact the large, modern plant of a company which recently closed down its operation permanently because of coal depletion, and this equipment will be moved to the mine site and erected as promptly as possible.



## 3 Strikes ON ACCIDENTS



*With*  
**DU PONT**  
**"CZC"**

**D**u Pont "CZC" wood preservative contributes to coal mine safety in three important ways which give protection for manpower, equipment and help maintain uninterrupted production schedules.

**FIRST**—Haulageway derailments due to tie decay are practically eliminated and the need for track walking and maintenance is greatly reduced when "CZC" ties are used throughout.

**SECOND**—Roof falls due to timber failure are not a constant hazard, and replacement and maintenance are greatly reduced when timbers and lagging are "CZC" treated.

**THIRD**—Fire hazards are reduced because "CZC" gives timber and ties definite measurable fire resistance.

### OTHER ADVANTAGES

By preventing decay, "CZC" multiplies the life of ties and timber 3 to 10 times, depending on conditions encountered. Treated room ties may be reused many times.

Odorless, paintable, easily fabricated, "CZC" treated timbering saves time, saves labor, cuts costs.

For further information write for your copy of "Wood Preservation for Mines." E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington, Delaware.



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**CHROMATED ZINC CHLORIDE**  
(WOOD PRESERVATIVE)

BETTER THINGS for BETTER LIVING... THROUGH CHEMISTRY

# HUSKY

## DUFF-NORTON JACKS



### FOR MODERN COAL MINING SERVICE

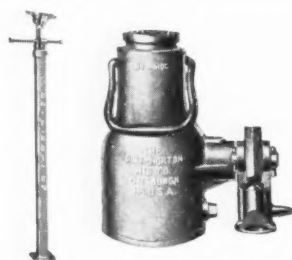
● Top speed is needed to meet the industry's 1942 goal of 660,000,000 tons—to keep your production rolling 24 hours a day!

Husky Duff-Norton Jacks help you maintain your production by providing mechanical muscles for every job of lifting, lowering, pushing and pulling from working face to tippie.

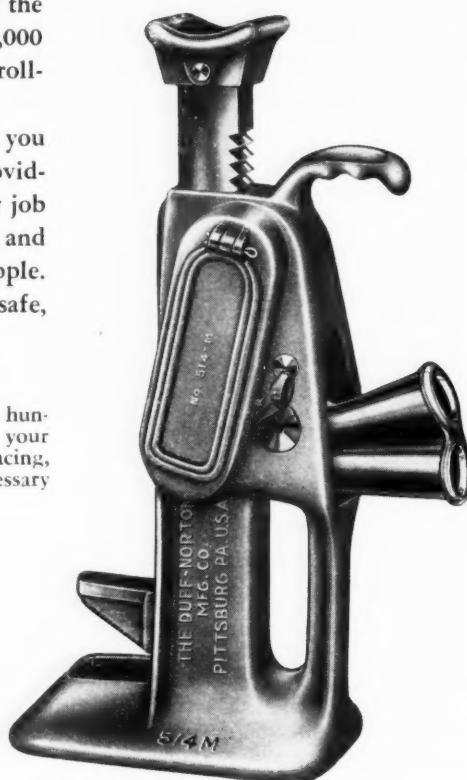
Use Duff-Norton Jacks for safe, dependable, efficient operation.

#### Many Types and Sizes

Duff-Norton Jacks are made in hundreds of types and sizes to meet your needs for timber lifting, roof bracing, cutting machine bracing and necessary jobs throughout your operations!



Here are but three of the Duff-Norton line of jacks for every purpose.



### THE RIGHT JACK AT THE RIGHT TIME

*Write*

FOR BULLETIN. Ask your Distributor for a copy of the bulletin "Duff-Norton Lifting Jacks for Modern Coal Mining Service". Gives sizes, ratings and prices of Duff-Norton Mining Jacks. If he hasn't a copy, we'll be glad to send you one by return mail.



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PITTSBURGH, PENNSYLVANIA

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### New Strip Mine Being Opened To Replace Pioneer No. 1

Pioneer Coal Co.—H. H. Spencer, president—affiliated with the Pittsburg & Midway Coal Mining Co., is opening a new strip mine near Walker, Mo., which will replace Pioneer No. 1, northeast of Pittsburg, Kan., now nearly worked out. At the new mine—to be known as Pioneer No. 3—a small tippie is being constructed, together with the necessary rail facilities, and a No. 6160 Monaghan 7-yd. electric dragline is being installed.

It is planned to have this small dragline operate in shallow stripping this fall and winter, producing about 15,000 tons of coal per month until early next spring. By that time Pioneer No. 1 will be worked out at its present location and the No. 320 electric shovel, larger loading equipment and a modern cleaning plant there will be moved to the new operation. When this equipment has been moved, No. 3 will have a capacity of 400,000 tons per year and will be equipped to produce all commercial and domestic sizes and wash the entire output.

The new mine will open a substantial new reserve of high-grade bituminous coal averaging less than 7 percent ash and well over 13,000 B.t.u. on the as-received basis. There is sufficient coal to prolong the life of the mine for many years. It will be on the Missouri-Kansas-Texas R.R. All coal produced from the mine will be distributed by the Pittsburg & Midway Coal Mining Co. Preliminary production is to start about Dec. 1.

### New Mining Towns Under Way

Construction of two large new mining towns was actively under way in Carbon County, Utah, last month. One, named Drager, is going up near Columbia, Utah, and will comprise 450 homes, representing an outlay of two to three million dollars. Sunnyside is the name of the second, under construction near Sunnyside by the Sunnyside Improvement Co., a subsidiary of the Utah Fuel Co. The initial cost will be over \$800,000, it is stated. Some 250 homes will be built and construction is expected to be completed by Jan. 1.

### 30 Teams in Big Sandy-Elkhorn Safety Contests

Some 4,000 rain-coated visitors were present Sept. 27 as 30 rescue and first-aid teams of the Big Sandy-Elkhorn Coal Mining Institute staged their annual safety meet. The teams competed for some \$4,000 in prizes. Consolidation Coal Co. Mine No. 206, whose captain was Blaine Sexton, won first place in the first-aid class over 26 other teams. Southeast Coal Co., Seco, Ky., J. H. Mosgrove captain, was second, and the same company's Millstone team was third.

Winners of the mine-rescue competition and their captains were: Consolidation Coal Co., Jenkins, Captain Al Corder, first; Inland Steel Co., Wheelwright, Captain Tom Layne, second, and Koppers Coal

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*These are fighting words. They speak the mood of American industry today. And of the war workers at the bench, the steel forge, the assembly line . . . They are words that say: We've got a big job to do and come hell or high water, that job will be done!*

So you, Mr. Mining Operator, have a job to do. The biggest, toughest, most important job you've ever had. A job that calls for non-stop production.

Here's one thing you can depend on: Proper lubrication, *designed especially*

*for your job*, will help you get the steady operation you need to meet your quotas—efficiently, economically—and on schedule.

Why not get together with a Cities Service engineer now? Let him work out a lubrication plan that will give you capacity operation—and help you avoid costly delays caused by improper mining machinery lubricants.

There is no charge for this consultation service. Just request, on your letterhead, that a lubrication engineer call.

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Co., Weeksbury, Captain Jesse Dale, third.

In the Negro first-aid events, Inland Steel, Wheelwright, won first place; Consolidation Coal Co., Jenkins, was second, and the same company's McRoberts team was third.

The Inland Steel Co., Wheelwright, captured first honors in junior contests; Consolidation, McRoberts, was second.

Tom Raney, international board member of the United Mine Workers; John T. Parker, Wheelwright, and Dr. M. D. Flanary, mayor of Pikesville, were speakers at the all-day meeting.

### A.S.T.M. Issues New Edition On Coal and Coke Standards

The American Society for Testing Materials has issued the 1942 edition of its compilation covering all of the 27 testing methods, specifications and definitions of terms developed through its Committee D-5 on Coal and Coke, in which leading consumers and producers are active. A number of changes appear in the latest edition as compared with the 1940 number, including modifications in standard methods of laboratory sampling and analysis of coal and coke (D 271-42).

### Texas-Illinois Pipeline To Be Extended to East

The 24-in. pipeline begun in August to bring oil from east Texas to Norris City, Ill., is to be extended to the Atlantic coast. Donald M. Nelson, chairman of the War Production Board, stated on Oct. 28 that he had approved the extension on the recommendation of Harold L. Ickes, Petroleum Coordinator, and would allocate the 224,000 tons of steel needed.

The 857-mile extension, costing \$60,000,000, said Mr. Ickes, will assure a direct daily delivery of 300,000 bbl. of crude oil to the eastern seaboard. The line will extend from Norris City across Indiana and Ohio to Phoenixville, Pa., whence branch lines will be laid to Philadelphia and New York. Ralph K. Davies, Deputy Petroleum Coordinator, said the first deliveries to the East would be made by June 1.

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with the confidence justified by the offering of these special services nationally.

Included in the compilation are specifications for classification of coals by rank and by grade, requirements for gas and coking coals, and specifications for sieves for testing purposes. The methods which are coming into widespread use cover coal-sampling procedure and methods of test for grindability (ball-mill and Hardgrove-machine methods), sieve analysis, agglutinating value, drop shatter test, and index of dustiness of coal and coke, and other corresponding tests for coke with additional tests for volume of cell space.

Copies of this 130-page publication may be obtained from the A.S.T.M. headquarters, 200 South Broad St., Philadelphia, Pa., at \$1.35 per copy.

### Big Sandy Mines Escape Fatalities for 2 Months

There were no fatal accidents during July and August in coal mines of the Big Sandy-Elkhorn Mining Institute, which include 92 percent of the operations in the Big Sandy field, according to A. D. Sisk, institute secretary.

### Bureau of Mines Approval

One approval of permissible equipment was issued by the U. S. Bureau of Mines in September, as follows:

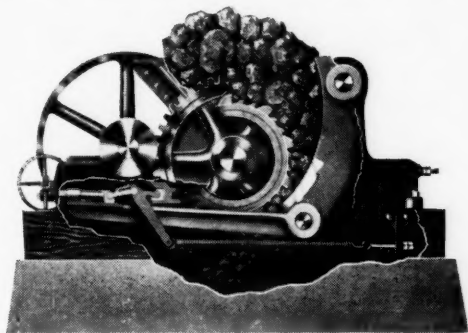
Joy Mfg. Co.—Type 14BU-3PME loading machine four 7½-hp. and 4-hp. motor, 250 volts, d.c.; Approval 458; Sept. 16.

### New Preparation Facilities

JEDDO-HIGHLAND COAL CO., No. 7 Harleigh Breaker, Jeddo, Pa.—Contract closed with Wilmot Engineering Co. for one 7-ft. Wilmot Hydrotator to prepare 35 t.p.h. of clean rice coal and one 12-ft. Wilmot classifier to prepare 20 t.p.h. of clean No. 5 coal.

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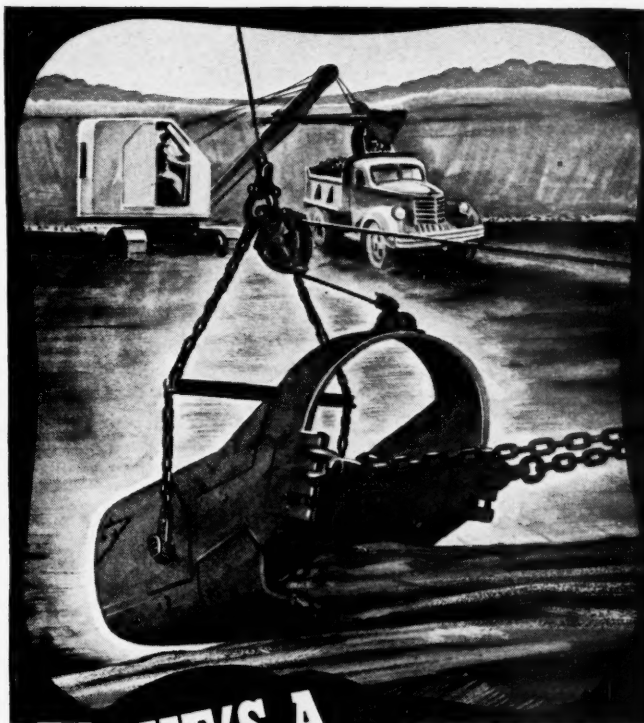
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In outstanding strip mines everywhere, you'll find Page AUTOMATIC Dragline Buckets digging in . . . speeding the handling of the overburden . . . uncovering America's vast coal resources.

By using ALL the weight for digging, PAGE Buckets will even dig shales and materials formerly requiring blasting. Because they are so shaped, designed and balanced that they AUTOMATICALLY land ready to DIG AT ANY DEPTH and use all the bucket weight for digging. Page AUTOMATIC Dragline Buckets have the reputation of out-digging other buckets of equal size and weight.

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Chicago, Illinois

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*Automatic*  
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**OXYGEN IS PRODUCTION — Don't Waste it!**



### THE WASTE WARDEN says:

- DO** close cylinder valve after use.
- DO** check your hose and connections for leaks.
- DO** keep your cylinder inventory low and return empties promptly.
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- ★ ★ ★
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- DON'T** abuse cylinders.



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at RIGHT ANGLES to the  
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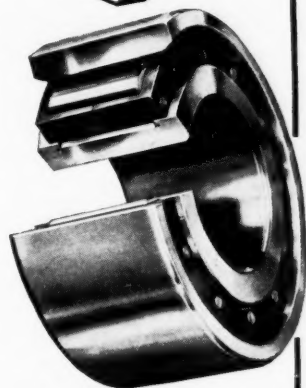
Rollway Heavy-Duty Roller Bearings separate THRUST from Radial... carry Thrust on a separate bearing assembly—*always at right angles to the roller axis*. Result: both thrust and radial bearings are more efficient... permit higher operating speeds... carry heavier loads in given dimensional limits. Chances are they'd help you to get better performance and longer life from your present machines, or improve the design of machines now on your drawing boards.

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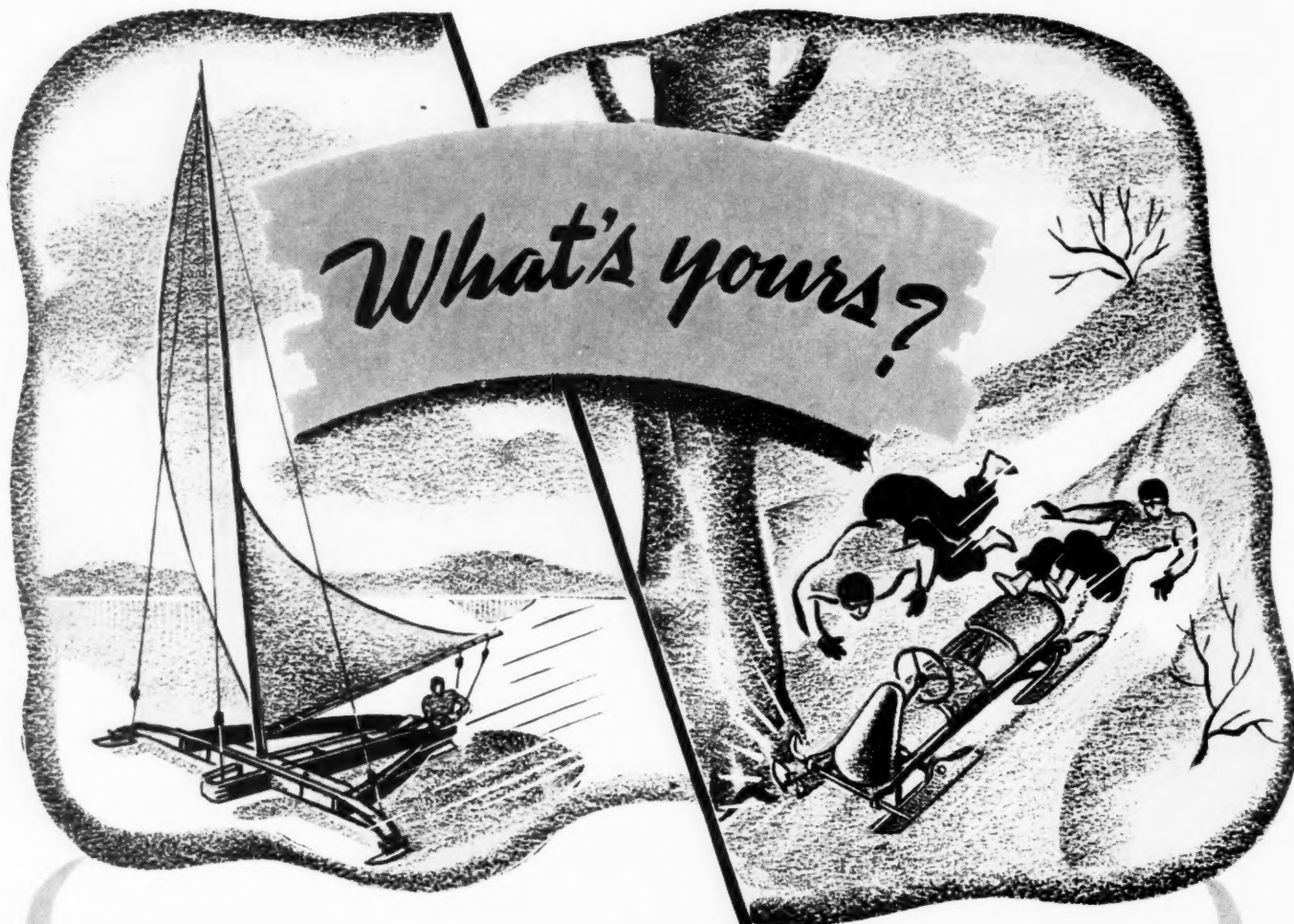
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This is plain: To have a chance in a competitive market, coal must be properly prepared—must be uniformly sized and thoroughly cleaned.

This, too, is plain: when our competitive market returns, the operator whose mine is up-to-date with efficient preparation equipment will find "smooth sailing"—compared to

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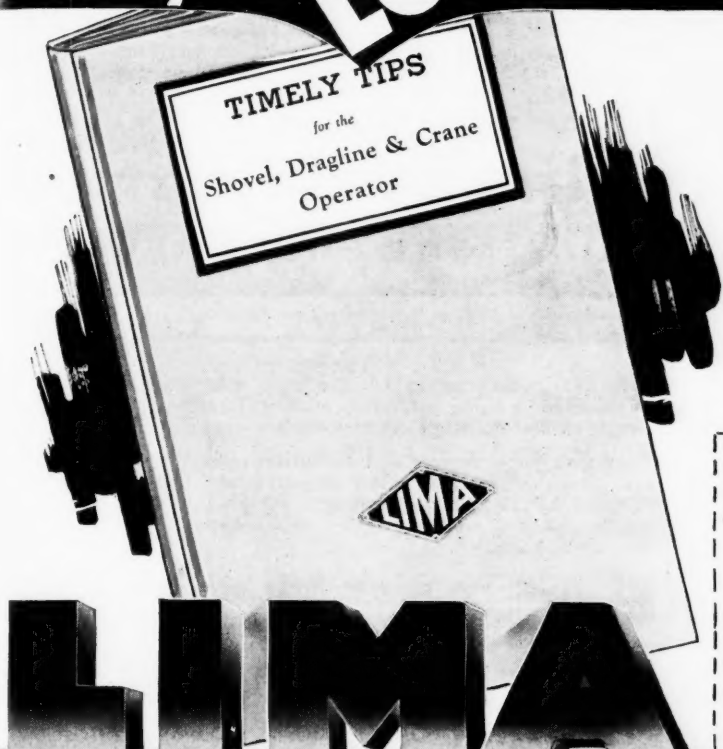
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Wash with solvent and blow dry to remove all old lubricant and foreign matter. Use an Ahlberg pressure gun and washer to make cleaning certain.



**LUBRICATE  
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Use the proper grade of good lubricant and keep it perfectly clean. Repack bearing carefully using the Ahlberg pressure gun.



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Worn Ball Bearings should not be "junked," but reprocessed. This saves valuable materials and takes the place of new bearings for replacement use.

# SAVE

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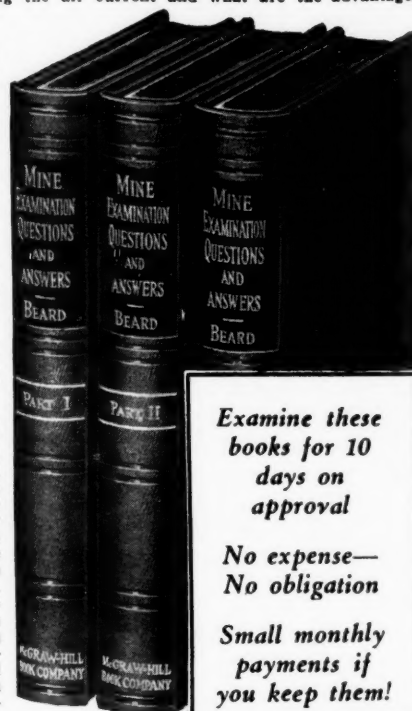
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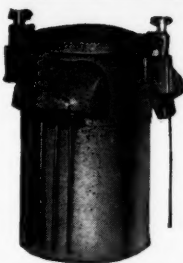
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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of Coal Age, published monthly at Albany, N. Y., for October 1, 1942.

State of New York } ss.  
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared J. A. Gerardi, who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Publishing Company, Inc., publishers of Coal Age, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, McGraw-Hill Publishing Company, Inc., 330 West 42nd St., N. Y. C. Editor (Acting), Ivan A. Given, 330 West 42nd St., N. Y. C. Managing Editor, None. Business Manager, H. W. Clarke, 330 West 42nd St., N. Y. C.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) McGraw-Hill Publishing Company, Inc., 330 West 42nd St., N. Y. C. Stockholders of which are: James H. McGraw, 330 West 42nd St., N. Y. C. James H. McGraw, Jr., 330 West 42nd St., N. Y. C. James H. McGraw, Jr., 330 West 42nd St., N. Y. C. James H. McGraw, Jr., 330 West 42nd St., N. Y. C. Curtis W. McGraw, 330 West 42nd St., N. Y. C. Curtis W. McGraw, 330 West 42nd St., N. Y. C. Donald C. McGraw, 330 West 42nd St., N. Y. C. Donald C. McGraw, 330 West 42nd St., N. Y. C. Anne Hugus Britton, 330 West 42nd St., N. Y. C. Mildred W. McGraw, Madison, N. J. Grace W. Mehren, 73 No. County Club Drive, Phoenix, Ariz. J. Malcolm Muir & Guaranty Trust Co. of New York, Trustees for Lida Kelly Muir, 140 Broadway, N. Y. C.

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5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is. (This information is required from daily publications only.)

J. A. GERARDI, Secretary.  
McGraw-Hill Publishing Company, Inc.

Sworn to and subscribed before me this 29th day of September, 1942.

[SEAL]

CHESTER W. DIBBLE.

Notary Public, Queens County, Queens County Clerk's No. 4166. Certificate filed in N. Y. Co. Clerk's No. 889.

(My commission expires March 30, 1943)

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### POSITION WANTED

COAL COMPANY EXECUTIVE, Well known in the industry, and thoroughly versed through years of experience in all phases of the coal business. Will shortly be available. Address PW-655, Coal Age, 520 N. Michigan Ave., Chicago, Ill.

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CONTRACTOR WANTED to strip coal. Long time proposition and large tonnage. Penowa Coal Company, 1104 B. Grant Building, Pittsburgh, Pa. Phone Atlantic 2389.

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**DIAMOND CORE DRILLING**, for any mineral. More than sixty gasoline, steam and electric drills, suitable for any job. OUR SPECIALTY—testing bituminous coal lands. Satisfactory cores guaranteed. Prices very reasonable.

### HOFFMAN BROS. DRILLING CO.

PUNXSUTAWNEY, PA. Est. 1902 Tel. 332

### FOR SALE

500 Ft. Second Hand Conveyor Belt, 48 Inch, 9 Ply, 32 Oz., 3/16" Top, 1/32" Bottom Cover

**ROGAN & ROGAN CO.**

Middlesboro, Ky.

Locomotives, gasoline & steam, narrow 36" & 36" ga., 7, 8, 10 and 18 tons.  
Monaghan Walker dragline, elec., 3-yd., 70' hm.  
Bucyrus-Erie 14-yd. GA-2 gas-air shovel.  
Bucyrus 80B high lift steam shovel, on cats.  
Euclid 6-yd. bottom dump cat wagons, (8).  
1000 HP hydro-electric plant, 60' head, A.C.  
Brownhoist 20-ton steam locomotive crane.  
Freeman truck turntable.  
Caterpillar 10-ton #60 gas tractors.

**H. Y. SMITH CO.** 828 N. B'way, Milwaukee Wis.





## SEARCHLIGHT SECTION



**6 YD. STRIPPER SHOVEL**  
200-B Bucyrus 6 years old. 75 ft. Boom, 60 ft. Dipper stick, 6 yd. Dipper Steam Shovel.

### LIGHT PLANT

4 KW Kohler 120 V—Gasoline Lighting Plant.

### DIESEL DRAGLINES

3W 4W & 5W Monighan Walkers, 90 to 110 ft. booms.  
3 Yd. P.H. 800, 97' boom.  
2½ Yd. 48B Bucyrus 80' boom.  
2 Yd. 750 Lima, 60' boom.

### AIR COMPRESSORS:

(7) Steam 66 ft., 300 ft., 600, 1000 & 1940 ft. (12") Belted, 360, 676, 870, 10000, 1300 ft. (12") Diesel 105, 315, 520, 676 & 1000 ft. (8) Electric, 1300, 1500, 2200, 2600, 5000 ft. (14) Gasoline, 110, 160, 220, 310 & 370 ft.

### COAL CRUSHERS:

Jeffrey Single Roll 18x18, 24x24 & 30x30 Link Belt 26x24 Double Roll Crusher

**HYDRAULIC CARWHEEL PRESSES:**  
100 Ton, 150 Ton, 300 Ton, 300 & 400 Ton Caldwell - Niles - Wood - Watson Stillman

### RUBBER CONVEYOR BELTS:

1000' 60", 600' 30", 300' 20", 1600' 42", 900' 48", 1450' 36", 1200' 24", 900' 18", 600' 16", 350' 14".

### CONVEYOR PARTS:

Idlers, Head & Tail Pulleys, Steel Frames, Tripper, etc., 14 in., 60 in. Large Stock here.

### SYNC. MOTOR GENERATORS & ROTARYS:

100 KW Ridgway 1200 RPM 3/60/2300/250-275  
150 KW G.E. 1200 RPM 3/60/2200-250-275  
200 KW Ridgway 900 RPM 3/60/2200-250-275  
3-100 KW G.E. 275 v. 1200 RPM Rotarys

### STORAGE BATTERY LOCOMOTIVES:

2½ ton Whitcomb 24 ga. New Batteries  
2-4 ton G.E. 30 in. ga.  
3-5 ton Mancha 30 in. ga.  
4-5 ton G.E. 36 in. ga.  
3-7 ton Goodman 36 ga. Battery & Trolley  
8-6 ton Baldwin Westgh. 42 ga. & 36 ga.

### TROLLEY LOCOMOTIVES:

2½ ton Westinghouse 24 ga.  
4-6 ton & 3-5 ton Goodman 36 ga.  
3-6 ton Goodman 30 ga.  
4-6 ton Goodman 42 ga.  
5-6 ton Westinghouse 42 ga.  
2-8 ton Goodman 36 ga.  
10 ton Goodman 42 ga. & 13 ton Jeffrey

### VIBRATING SCREENS:

9 Tyler Hummer 3x6, 4x5, 4x8 & 4x10  
2 Robins Gyrex 4x8½  
4x12 Niagara, 3x8 L. B., 5x6 Simplex

### CARS:

120-4 ton 42 ga. S.D. Mine Cars  
60-Western 16-20-30 yd. Side Dump

### SHOVELS, CRANES & DRAGLINES:

8 W 90' Boom, 6 W 160' Boom, Model 6150, 175' Boom, Diesel, Monighan Walkers  
1 yd. K 30 Link Belt 50' Boom Crane  
2 yd. Page 70' Boom Diesel Dragline  
1½ yd. Marion 450 Elec. Shovel  
1½ yd. Lima Diesel Shovel & Dragline  
2 yd. Link Belt Elec. Shovel & Dragline  
25 ton Browning 50' Boom Loco. Crane  
7 Conway 20A, 30A, 50A, 60 & 75 Muckers

### MINE LOADERS:

Junior Joy 36 ga. Low Pan  
Conway 30 Mucker  
8-5 BU & 7 BU 36 or 42 ga. Joy  
9-Goodman 200 & Jeffrey 441

### MISCELLANEOUS:

5'x160' Traylor Rotary Dryer  
100 HP G.E. 3/60/440 v.-900 RPM Elec. Motor  
6 Goodman 12CA & 12DA 6 ft. Cutters  
9x8 Sullivan Mine Compressors  
Clamshell Buckets ¾, 1, 1½ & 2 yd. Cap.  
30 ton & 12 ton Vulcan Std. Ga. Gas. Loco.

### WANTED TO BUY:

Complete Mines—M.G. Sets, Locomotives, Compressors, Conveyors, Cranes, Crushers & Rotary Converters. Also Rails, Screens, Pumps, Cars, Mine Loaders & Mining Machines.

**Tidewater Equip. & Machy. Corp.**  
305 Madison Ave. New York, N. Y.

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**WE BUY AND SELL**

**MOTORS**

**TRANSFORMERS**

**MOTOR GEN. SETS**

**OIL SWITCHES**

**AIR CIRCUIT BREAKERS**

**ELECTRIC EQUIPMENT CO.**

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Tel. Glenwood 6783

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## FOR SALE

### JOY LOADING MACHINES

15—5-BU Joy Loading Machines, 250 volt. Just taken out of service and in excellent condition. Have been loading 450-ton of coal per shift.

### STEEL MINE CARS

100—2½-ton, 42" gauge rotary dump mine cars in perfect operating condition. Height overall 38", length 122", width 62½", length of body 98", 90 cu. ft. level full, 16" Timken Bearing Wheels, link and pin couplers, 4-wheel brakes, equipped with car haul bracket on bottom, Toncan Copper Bearing Steel used in sides and ends.

### ELECTRIC HOISTS

1—300 H.P. Nordberg Shaft Hoist, cylindro-conical drum 225' lift.  
1—1300 H.P. Vulcan Shaft Hoist, cylindro-conical drum, 1600' lift.  
1—1300 H.P. Ottumwa Shaft Hoist with double cylindro-conical drums, suitable for 675' lift.

### STEEL TIPPLES

1—Link-Belt practically new re-screening plant, all steel structure, 100-tons.  
We have several 3, 4 and 5-track steel tipples for slope, shaft and drift mines.

### SHORTWALL MINING MACHINES

15—Jeffrey 35-A, 50 H.P., 250 volt DC, 7½' cutter bars.  
7—Sullivan CE-7 AC Shortwall Mining Machines, 7½' cutter bars, self-propelled trucks and cable reels.

### LOCOMOTIVES

2—Goodman 16-ton Tandem Locomotives, consisting of (4) 8-ton Goodman Locomotives with 132-O-4-T, 250 volt ball bearing motors, equipped with equalizers and contactor control. Complete specifications on request.  
27—6, 8, 10 and 15-ton completely rebuilt and some slightly used locomotives. Any type, make or gauge that you are looking for.

We Specialize in Buying Complete Mines That Are Going Out of Business or From Receivers in Bankruptcy, Administrators of Estates, Etc.

**COAL MINE EQUIPMENT SALES COMPANY**  
306-7 Beasley Building L. D. Phone 34 Terre Haute, Indiana



Frank J. Wolfe

## FOR SALE

**1—STEEL COAL TIPPLE COMPLETE, including the following Machinery and Equipment.**

- 1—G.E. 50 HP Motor 220 volt 860 RPM
- 1—G.E. 5 HP Motor 220 volt 865 RPM
- 2—Westinghouse 10 HP Motors 220 volt 870 RPM
- 2—Westinghouse 7½ HP Motors 220 volt 870 RPM
- 1—Westinghouse 15 HP Motor 220 volt 825 RPM
- 1—Marcus Screen 10'10" wide with Picking Table
- 2—Leading Booms Pan Type 4'x6' wide
- 1—Zobell Boom Hoist with 5 HP Motor 220 volt 1600 RPM
- 1—Zobell Boom Hoist with 3 HP Motor 220 volt 1600 RPM
- 1—Drag Conveyor 105' long 18" wide
- 1—Chain Flight Conveyor (Scraper 32" wide)
- 1—Bucket Elevator 120' long 8"x14" buckets
- 1 set—Hoyl & Patterson Jouncer Screens
- 1—Fairbanks 10 Ton Dial Scale Drop Bottom Weight Hopper

**BRIGGS & TURIVAS, INC.**  
Box 448 Imperial, Pa.

- 1—Stroudsburg Hoist complete with gears 48 inches long, 30 inch diameter.
- 1—35 H.P. Type S Westinghouse 230 Volt D.C. Motor.
- 2—25 KVA Transformers 2200 volts to 220 volts.
- 1—150 H.P. 250 volt D.C. Street Car Motor.
- 390—Fairmont Steel Ties 32" track gauge.
- 1—36" x 28" Mine Fan complete.
- 1—75 H.P. G.E. Motor, 220 volts A.C., 750 R.P.M., Form M, Serial No. 624887.
- 1—35 H.P. Westinghouse Type S, 250 volt D.C. Motor, 850 R.P.M.
- 3—Sullivan Type CE-7 Cutting Machines, 250 Volt D.C. complete with trucks.
- 1—G.E. gear and induction Motor—gear ratio 15-7, 111 R.P.M., Type K, 7 H.P., 1750 R.P.M., 440 volts A.C.
- 1—Standard Engineering Co. Pipe Threading Machine complete with dies. Threading range 2"-6".
- 1—Fort Wayne Electric Rock Drill, type A with 230 volt D.C. motor.
- 1—Type 90 L-22 Goodman Elevating Conveyor with 10 H.P. 230 volt D.C. motor.
- 1—Goodman type 90-L Elevating Conveyor with 5 H.P., SK Westinghouse 230 volt D.C. motor.

**BATON COAL CO.**  
UNION TRUST BLDG.  
PITTSBURGH, PA.

## PIPE—MACHINERY—GAS ENGINES AIR COMPRESSORS—DIESELS—PUMPS

Some Steam Engines and Boilers available only slightly above the metal price

**BRADFORD SUPPLY COMPANY**  
WAYNE, WOOD COUNTY, OHIO Near Toledo

## LINK-BELT UNLOADING TOWER

SUITABLE FOR COAL OR ORE

GANTRY TYPE • CAPACITY 750 T.P.H.

RAIL SPAN 44' • OVERALL HEIGHT 114' WIDTH 166'  
COMPLETE WITH WIRING AND 8 SELF-CONTAINED  
3 PHASE MOTORS AND BUCKET

**ERMAN-HOWELL & CO., INC.**

332 S. MICHIGAN AVE.

CHICAGO, ILL.





## REBUILT EQUIPMENT—READY TO SHIP

## MINING MACHINES

CE-8 Sullivan 250 v. DC.  
CM-7 Sullivan Shortwall 250 v. 6' bar

## MINE LOCOMOTIVES

6 ton Atlas 250 v. 3 ph. 60 cy. 35' ga.  
10 ton Milwaukee GASOLINE

## ROTARY CONVERTERS

1—800 kw. G.E., type HC-8, 600 volt,  
900 rpm. complete with transformers  
and switchboards.  
200 kw. G.E. 275 v. DC 900 rpm. complete  
with transformers.

## TRANSFORMERS—1 ph. 60 cy.

3—1500 kva, 22000, 6600 Pgh.  
1—220 kva, 2300, 115/230 All. Ch. 3 ph.  
3—150 kva, 22000, 6600 Pgh.  
1—150 kva, 2200, 230/460 G.E. 3 ph.  
1—100 kva, 2200, 110/220 G.E. 3 ph.  
3—100 kva, 6600, 550/440/220 Pgh.  
1—100 kva, 2200, 110/220 West.  
2—75 kva, 2200, 220 Burke 3 ph.  
3—50 kva, 2300, 220/440 G.E. 1 ph.  
3—50 kva, 11430/6600, 550 Al. Ch.  
3—50 kva, 6600, 575 G.E.  
1—50 kva, 2200, 220 Burke  
3—50 kva, 2200, 110/220 West.

## SPEED REDUCERS

Thomas, 3 HP ratio 100:1  
Falk, 150 HP ratio 7:31 to 1.  
Kerr, 275 HP ratio 3800 rpm. to 720 rpm.

## 230 V. D.C. MOTORS

HP.	Make	Speed
125	G.E.	1750 rpm.
100	West.	250
85	G.E.	530
75	West.	1700 rpm.
75	West.	475
75	Itellance	1750
50	West.	975 rpm.
50	West.	1700 rpm.

## M. G. SETS—SYNCHRONOUS

200 kw. West. 600 v. DC 600 rpm. 2200/  
3/60.  
180 kw. West. 275 v. DC 600 rpm. 2200/  
3/60.  
125 kw. Cr. Wh. 250 v. DC 1200 rpm.  
220/440/3/60 Ind.  
30 kw. West. 60 v. 1750 rpm. dir. con.  
220/440/3/60 Ind.

## A.C. GENERATOR—3 ph.

60 cy.  
219 kva G.E. 2200/440/220 v. 200 rpm.

## HOISTS

25 HP. Thomas 13" face 20" dia.  
40 H.P. single drum AC 220/3/60.  
100 H.P. Lidgerwood 2 drum AC or DC  
Motor

## CENTRIFUGAL PUMPS

4x3 Harris, 320 rpm.  
4x4 Weinman, 500 gpm.  
6x6 Gould, bronze, 1300 gpm.  
8x8 Weinman, bronze.  
5x6 Haydon, 750 gpm.  
6x6 Manistee, 750 gpm.  
6x6 American, 1000 gpm., bronze.  
6x6 Weinman, 1000 gpm.

## ENGINE GENERATOR SETS

50 kw. 250 V. D.C. Generator direct con-  
nected to International Diesel Engine.  
50 kw. West. 220/3/60 AC STEAM  
75 kw. G.E. 220/3/60 Bessemer GAS.  
75 kva. Allis Chas. 220/3/60 dir. con.  
14x14 Steam Engine.  
80 kw. West. 250 V. Belted 110 Bes-  
semer GAS.  
175 kw. G.E. 2200/3/60 Ridgway STEAM.  
225 kw. Elec. Machy. 2200/3/60 Ideal  
STEAM.

## TURBINE

1—Kerr Steam Turbine 450 BHP 3800  
rpm., 5" intake 12" exhaust with Kerr  
Reduction Unit 3800 to 720 rpm., 115#  
pressure.  
1—1000 kw. G.E. Turbo 6600/3/60 150#  
Pres.

## SLIPRING MOTORS—3 ph. 60 cy.

No.	HP	Make	Type	Volts	Rpm.
1	1500	Allis. Chas.	ANY	2200	455
1	700	G.E.	MF-432	2200	392
1	400	West.	CW	2200/850/2.0	435
1	400	West.	CW-957A	220/440	1170
1	300	G.E.	I-M	220/440	600
1	280	Burke	EMV-65	220/440	600
3	250	G.E.	I-M	550	600
3	250	G.E.	I-M	2200/220/440	600
3	200	G.E.	I-M	2200/220/440	600
1	200	G.E.	I-M	2200	514
1	200	West.	CW-956A	2200	690
1	150	G.E.	I-M	220/440	900
1	100	West.	CI	220/440	1750
1	75	West.	CI	220/440	880

## SQUIRREL CAGE MOTORS—3 ph. 60 cy.

HP	Volts	Make	Type	Speed
500	2200/440/220	West.	CS	720
400	2200/440/220	West.	CS	500
450	2200/440/220	West.	CS	600
400	2200/440/220	West.	CS	600
350	2200/440/220	West.	CS	450
300	2200/440/220	West.	CS	400
200	2200/440/220	West.	CS	250
200	220/440	West.	CS	580
200	2200	West.	CS	870
150	550/220/440	G.E.	—	575
150	220/440	G.E.	KT-562	690
150	2200/440/220	Al. Ch.	Syn.	1200

## PUMPS

2—1000 GPM. Cameron solid  
bronze 100' head.

## PLATFORM SCALES

1—Fairbanks Morse 5000#.

## LOADING MACHINES

5—Goodman A C Duckbills.  
8—Goodman E-11-70 shaker drive  
units.  
1—Joy Jr. Loading Machine 440  
v. A C 42" ga.

DUQUESNE ELECTRIC &amp; MFG. CO. . . . PITTSBURGH, PA.

## MINING MACHINES

Goodman Standard & Universal.  
AC & DC Rebuilt & Guaranteed.

## MINE LOCOMOTIVES

5 to 20 ton.

## STRIPPING SHOVELS

## M. G. SETS &amp; ROTARY CONVERTERS

## PUMPS and FANS

## COAL CRUSHERS

Will buy, sell or exchange.  
What do you need?

## The Industrial Equipment Corp.

Warehouse: Carnegie, Pa.

P. O. Box 1647 Pittsburgh, Pa.

## MINE EQUIPMENT

## FOR SALE

Locomotives—Mining Ma-  
chines—Pumps—Motors—  
Transformers—Steel Tip-  
ples—Rescreeners—  
Steam Hoists—Electric  
Hoists—Compressors—  
Loading Booms—Engines—  
Generators—Scales—Mis-  
cellaneous Mine Equip-  
ment

Complete Mines dismantled and sold.

## HAIR EQUIPMENT COMPANY

Office and Warehouse  
Reed and Election Streets  
BENTON, ILLINOIS

## FOR SALE

- One NORDBERG Hoist No. 06392,  
4 ft. drum, hydraulic brake direct  
connected 150 h.p., GE motor AC,  
440 v. 3 ph. 60 cycle, speed 585,  
complete with panel board and am-  
meter.
- Three GE 50 KVA Transformers.
- One POMONA Vertical Pump, 75 h.p.,  
AC, 250 v. 60 cy. 3 ph. Westinghouse  
motor, together with starting com-  
pensator, capacity 1000 gal. per min.,  
200 feet head.
- One ALLIS CHALMERS Pump, type  
BS 13406, 100 h.p., motor AC, 220 v.  
60 cy., 3 ph., capacity 1000 gal. per  
min., 250 feet head.
- One GE MOTOFLOW model 5 KF 404  
DWL Pump direct connected, 40 h.p.  
motor AC 440-220 v., 60 cy., 3 ph.,  
4" suction 2" discharge, capacity 300  
gal. per min., 340 feet head.

All of the above equipment in first class  
operating condition

FS-651, Coal Age

520 No. Michigan Ave., Chicago, Ill.

## ROTARY CONVERTERS

500 KW WEST. SYN. 275 V., 6 Ph., 60 Cy., 1203  
RPM. Pedestal type, 2300/4000 V. Transformers.  
500 KW G.E. SYN. 575 V. HCC, 6 Ph., 60 Cy.,  
1200 RPM, form P, 2300/4000 V. Transformers.  
200 KW AL-CH SYN. 275 V. 6 Ph., 60 Cy., 1200  
RPM. Pedestal Type, 2300/4000 V. Transformers.  
150 KW R.W. SYN. 275 V., 6 Ph., 60 Cy., 1203  
RPM. Pedestal type, 440/2300/4000 V. Trans.

## MOTOR GENERATORS

300 KW WEST SYN., 600 V., 2300 V., 3 Ph., 61  
Cy., 80% P.F., 900 RPM. Manual Switchgear  
200 KW G.E. IND., 275 V., 440 V., 3 Ph., 60  
Cy., 720 RPM. Manual Switchgear.  
200 KW G.E. IND., 600 V., 2300/4000 V., 3 Ph.,  
60 Cy., 1200 RPM. Manual Switchgear.  
200 KW G.E. SYN. 600 V., 2300/4000 V., 3 Ph. 60  
Cy., 80% P.F. 720 RPM Manual Switchgear.  
200 KW R.W. SYN. 275 V., 2300/4000 V., 3 Ph.  
60 Cy. 80% P.F. 600 RPM, Manual Switchgear.

## LOCOMOTIVES

13-T JEFFREY, 250 V., MH-110 Mts., 44"-36" Ga.  
13-T JEFFREY, 500 V., MH-110 Mts., 44"-36" Ga.  
10-Ton GOODMAN, 250 V., 29-A Mts., 44"-36" Ga.  
10-Ton WESTGHE, 500 V., 927-C Mts., 44"-36" Ga.  
8-Ton WESTGHE, 250 V., 906-C Mts., 44"-36" Ga.  
6-Ton JEFFREY, 250 V., MH-88 Mts., 42"-36" Ga.  
6-Ton WESTGHE, 250 V., 904-C Mts., 42"-36" Ga.  
5-Ton WESTGHE, 250 V., 902-B Mts., 56 1/2" Ga.  
4-Ton WESTGHE, 250 V., 902-C Mts., 36" Ga.  
4-Ton GOODMAN, 250 V., 42-I Mts., 44" Ga.

Each unit listed above is owned by us and  
is available now for immediate purchase.

## WALLACE E. KIRK COMPANY

Incorporated

501 Grant Building Pittsburgh, Pa.

## RAILS and ACCESSORIES

RELAYING RAILS—Super-quality machine-recon-  
ditioned—not ordinary Relays.  
NEW RAILS, Angle and Splice Bars, Bolts, Nuts,  
Spikes, Frogs, Switches, Tie Plates, and all  
other Track Accessories.

Phone, Write or Wire

L. B. FOSTER COMPANY, Inc.

PITTSBURGH NEW YORK CHICAGO

## NEED DUMP CARS?

IMMEDIATE DELIVERY

12, 24-yd. Koppel 9, 16-yd. Kilbourne & Jacobs  
24, 16-yd. Western 62, 12-yd. Western

Illustrated specifications available

OTHER TYPES OF CARS TOO

Also Locomotives, Cranes, Shovels, Etc.

IRON & STEEL PRODUCTS, INC.

13484 S. Brainerd Ave. Chicago, Illinois

"ANYTHING containing IRON or STEEL"

## SEARCHLIGHT SECTION

**BUY FROM A CONCERN BOTH FINANCIALLY AND MORALLY RESPONSIBLE**

### LOCOMOTIVES

**Goodman:** All 250 volts.  
1—10 ton, 31-1-4-T  
1—6 ton, 30B, 48" 1—5 ton.  
1—5 ton, W-1-2, 36"  
**Westinghouse:** All 250 volt.  
1—4 ton, 902, 48" 1—18-ton, 102, 42"  
1—904 c. 44" 500 volt. Also 906 motors.  
1—10 ton, 915  
**G.E.:** All 250 volt. 5 ton 825, 44"  
6 ton 803, 44", as is 4 ton 1022, 41, as is

**AERIAL TRAMWAYS \* HOISTS \* PUMPS \* MOTORS \* TRANSFORMERS \* BOND WELDERS \* RESISTANCE \* COMPRESSORS \* DUMPS \* SPEED REDUCERS**  
**FIELD FRAMES \* ARMATURES \* GOODMAN HYDRAULIC SHOVEL \* MOTOR STARTERS AND CONTROLLERS—AC & DC \* DROP BAR SUPPORTS (Goose-**  
**neck), 29B and 29C \* MINING MACHINE TRUCKS \* SWITCHBOARDS \* CIRCUIT BREAKERS—AC & DC \* CONVEYOR HOISTS \* COAL CRUSHERS (double**  
**roll 12"x16", single roll 24"x24" and 18"x16" \* Sullivan BIT SHARPENER \* TURBO-GENERATOR 500 K.W. 275 volt DC \* ROPE & BUTTON CONVEYOR 400' long**  
**LATHES, SHAPERS \* LINK BELT \* ELECTRIC SLATE DUMP \* 2 SIRENS A.C. \* RAILWAY SWITCHES 100# and 130#, STEAM POWER PLANT, 2 Boilers**  
**2 turbo-generators, 2300 volt. 1 Clam shell bucket 1 1/4 cubic yard, 1—Figure 8 drum and mine cars 48", 1 1/2 ton.**

**GUYAN MACHINERY COMPANY, Logan, W. Va.**

### For Sale

20, 5BU Loading Machines

#### A. C. MOTORS

30 Units, 15 to 75 H.P. squirrel cage  
3/60/440

#### D. C. MOTORS

15 Units, 3 H.P. to 60 H.P., 230 V.  
40 KW, 110 V. D.C. Generator  
200 KW, 600 V. Motor Generator Set  
synch. motor, 3/60/2200  
1000 KW Turbine Type G.E. Generator  
3/60/2300, 3600 RPM  
500 KW G.E. Skinner Uniflow Steam En-  
gine Generator, 250 V. D. C.  
500 KW Westinghouse Motor Generator  
Set  
6 1/2-yd. 320-B Bucyrus Stripping Shovel  
3/4-yd. P. & H. Crawler Crane, 38' boom

### IRON & STEEL PRODUCTS, INC.

37 years' experience  
13484 S. Brainard Ave., Chicago, Illinois  
"Anything containing IRON or STEEL"

Immediate Shipment  
Low Prices

## NEW RUBBER

Guaranteed  
High Grade

### CONVEYOR and TRANSMISSION BELTING

CONVEYOR BELTING ABRASIVE RESISTANT COVERS				TRANSMISSION BELTING HEAVY-DUTY FRICTION SURFACE				ENDLESS "V" BELTS	
Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers	"A" — WIDTH —	All Sizes
48"	8	1/4"	1/16"	18"	6	10"	6"	"B" — WIDTH —	All Sizes
42"	8	1/4"	1/16"	16"	6	10"	5"	"C" — WIDTH —	All Sizes
36"	6	1/4"	1/16"	14"	6	8"	6"	"D" — WIDTH —	All Sizes
30"	6	1/4"	1/16"	12"	6	8"	5"	"E" — WIDTH —	All Sizes
30"	5	1/4"	1/16"	12"	5	6"	6"	Sold in Matched Sets	
24"	5	1/4"	1/32"	ELEVATOR BELTING					
24"	4	1/4"	1/32"	HEAVY DUTY RUBBER COVERED					
20"	5	1/4"	1/32"	Width	Ply	Top-Bottom	Covers	RUBBER HOSE	
20"	4	1/4"	1/32"	12"	6	1/16"	1/16"	ALL SIZES FOR	
18"	4	1/4"	1/32"	14"	6	1/16"	1/16"	AIR — WATER —	
16"	4	1/4"	1/32"	16"	6	1/16"	1/16"	STEAM — SUCTION —	
14"	4	1/16"	1/32"	18"	6	1/16"	1/16"	FIRE — WELDING	
12"	4	1/16"	1/32"					ETC.	

Inquire For Prices —: Mention Size and Lengths

**CARLYLE RUBBER CO., Inc.**  
66 PARK PLACE  
New York, N. Y.

## PUMPS

Two—United Iron Works Size  
8 MSD—4 Stage 3000 GPM—  
700 Ft. Head 10" Suction 8"  
Discharge—700 H.P. G.E. Mot-  
ors—2300 Volt—3 Phase—60  
Cycle—145 Amps.

Many Other Pumps Various  
Sizes and Capacities  
**IMMEDIATELY AVAILABLE**

**PLEASANTVILLE CONSTRUCTORS,  
INC.**

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100 KW Cr. Wh. 2502 DC—440/3/60 1200 RPM
100 KW G.E. 550 v. D.C. 2200/3/60 A.C. 900 RPM.
90 KW Al. Ch. 250 v. 2200 v. AC 900 RPM.

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13 Ton Westgh-40" Ga. 500 volts 5 ton Ironton
Type Storage Battery 42" Ga.
5½ Ton Type D Ironton 36" Ga. with 48 cell 21
plate Exide Battery.
Charging M.C. Set & Panel for loco.
5 Ton Jeffrey Storage Battery 42 to 44" Ga. 2 BB
motors, Batter box on top.
6 Ton Whitcomb 50 v. 40" Ga.
8 Ton Jeffrey 250 v. 42" Ga. MH 100 Motors
10 Ton West. 250 v. 42" Ga.
12 Ton Jeffrey 250 v. 40" Ga. MH 74 Motors

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2—CE 7 Sullivan DC standard 30 HP
1—12 G3 Goodman Std. Truck 220/3/60 6' bar.

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HP	Make	Speed	Wdg.	Type
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400	West.	600	S.C.	CS
300	G.E.	600	S.R.	IM
200	Cr. Wh.	440	S.R.	28
200	G.E.	600	S.R.	I-L
200	Al. Ch.	600	S.C.	
150	G.E.	720	S.R.	IM
150	G.E.	600	S.R.	I-L
150	West.	580	S.C.	CCL
150	G.E.	600	S.R.	IM
125	G.E.	600	S.R.	I-L
125	Al. Ch.	435	S.R.	
125	Burke	1200	S.C.	
100	P.M.	600	S.C.	BB
100	Burke	900	S.C.	
100	G.E.	500	S.R.	MI-25 cy
75	G.E.	865	S.C.	KT

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75 HP Lidgerwood sgl fr. drum
50 HP Diamond 2 drums same Shaft
30 HP Clyde sgl. drum AC Motor
25 HP Thomas sgl. drum AC Motor
15 HP Lidgerwood sgl. dr. AC Motor Pumps

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Qu.	KVA	Pr. V.	Sec. V
3	1	2080/2200	115/230
6	2	"	"
100	5	"	"
82	7½	"	"
71	10	"	"
15	25	"	"
1	30	"	"
3	37 Rotary	4400/185	"
2	100	"	"
1	150	3 Phase	230/460

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100 KW 250 v. DC Westgh.—Skinner Engine

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150 cu. ft. Sullivan WK26 Port. 100# pres.  
200 cu.ft. Sullivan WO3 100# pres.

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- 1—35 KW 125 V Battery Charging Set.

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- 2—5 ton G. E. HM 825 motors with gathering reel.

#### CUTTING MACHINES

- 8—35B Jeffrey 250 V Shortwalls.
- 1—35BB Jeffrey AC Shortwall.
- 1—12G3 Goodman AC Shortwall.
- 2—12AB Goodman 210 V DC Shortwall.
- 1—29B Jeffrey Arcwall DC.
- 1—29C Jeffrey Arcwall DC.
- 1—29LE Jeffrey with turn over head AC Motors.
- 1—29LE Jeffrey with DC Motors.

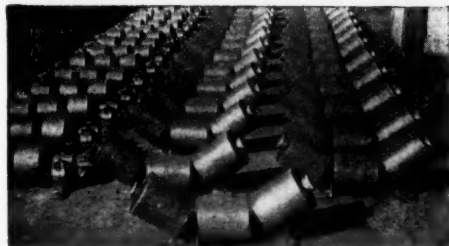
#### MISCELLANEOUS

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- 1—36" x 36" single roll coal crusher.

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Nelsonville, Ohio



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DESIGNERS AND BUILDERS OF COAL HANDLING EQUIPMENT FOR OVER 25 YEARS

Shaking Screens  
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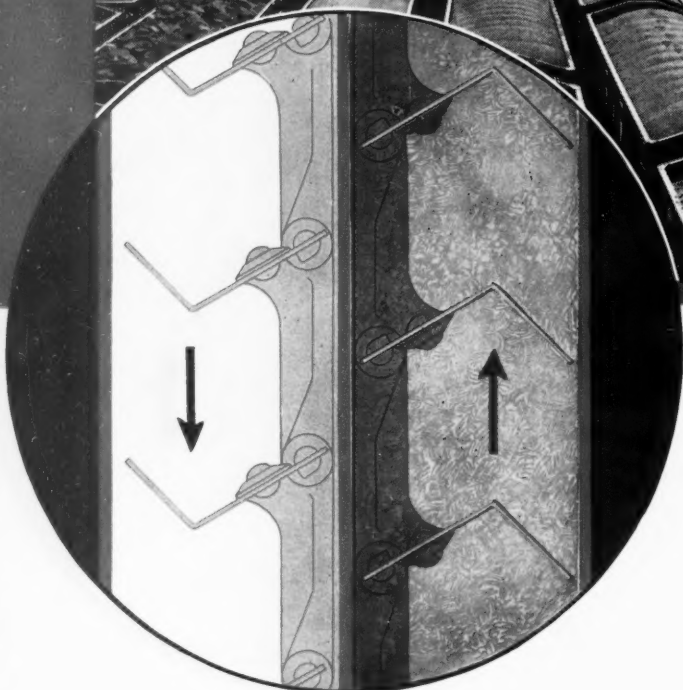


# LINK-BELT Bulk-Flo

## THE SELF-FEEDING SELF-CLEANING ELEVATOR-CONVEYOR



**MOVES COAL and Other FLOWABLE MATERIALS in Compartments, Like an Endless Train**



● The Link-Belt Bulk-Flo conveyor-elevator-feeder cuts handling cost by removing the limitations of alternate methods. It moves materials in compartments, like an endless train—horizontally, vertically, on slants any degree, around corners, in many combinations.

Its moving element is a specially designed chain with peak-shaped cross-flights at each pitch, forming the series of compartments which hold the material. This design gives automatic feed . . . quick, clean discharge . . . smooth, reliable, low-cost operation. Installation requires much less space and you save also on supporting structure. Extreme flexibility of layout makes possible a simple, low-cost solution to what might otherwise be a complicated, expensive handling problem.

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Chicago, Philadelphia, Pittsburgh, Wilkes-Barre, Huntington, W. Va., Denver, Kansas City, Cleveland, Indianapolis, Detroit, St. Louis, Seattle, Toronto, Vancouver.

### Saves Space

Bulk-Flo is unusually compact, effecting a considerable saving in space requirements and supporting structure.

### More Flexible

Bulk-Flo can be laid out to carry vertically, horizontally, around corners, along curves and on slants of any degree. Loading and discharge points can be located to suit. Tandem units can also be used.

### Self-Feeding, Enclosed

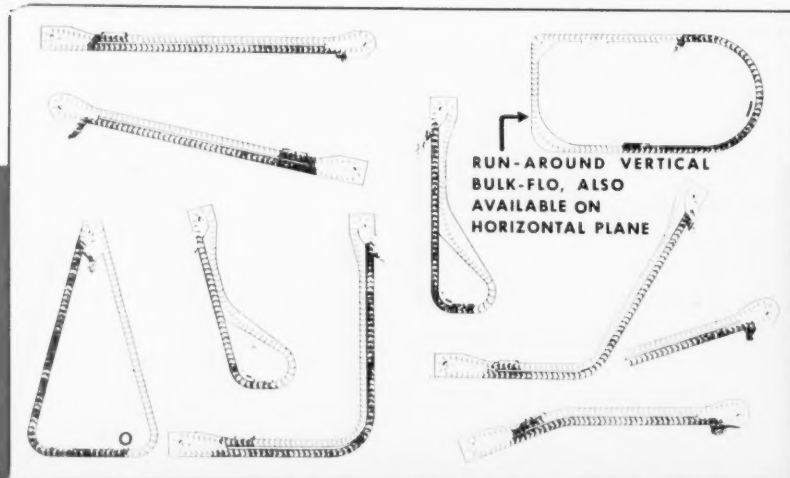
Bulk-Flo is self-feeding to capacity from bins, hoppers and chutes. It cannot flood. Material is moved in a dust-tight casing. It operates under partial loading with as high efficiency as when fully loaded.



### This Book Has Full Information

Book No. 2075 contains a complete presentation of Bulk-Flo with engineering tables and illustrations. Send for a copy.

Below: Some of the many arrangements available with Bulk-Flo to provide simple, low-cost solutions to handling problems within its scope. Often tandem units are used to advantage.



### Slow Speed: Large Capacities

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